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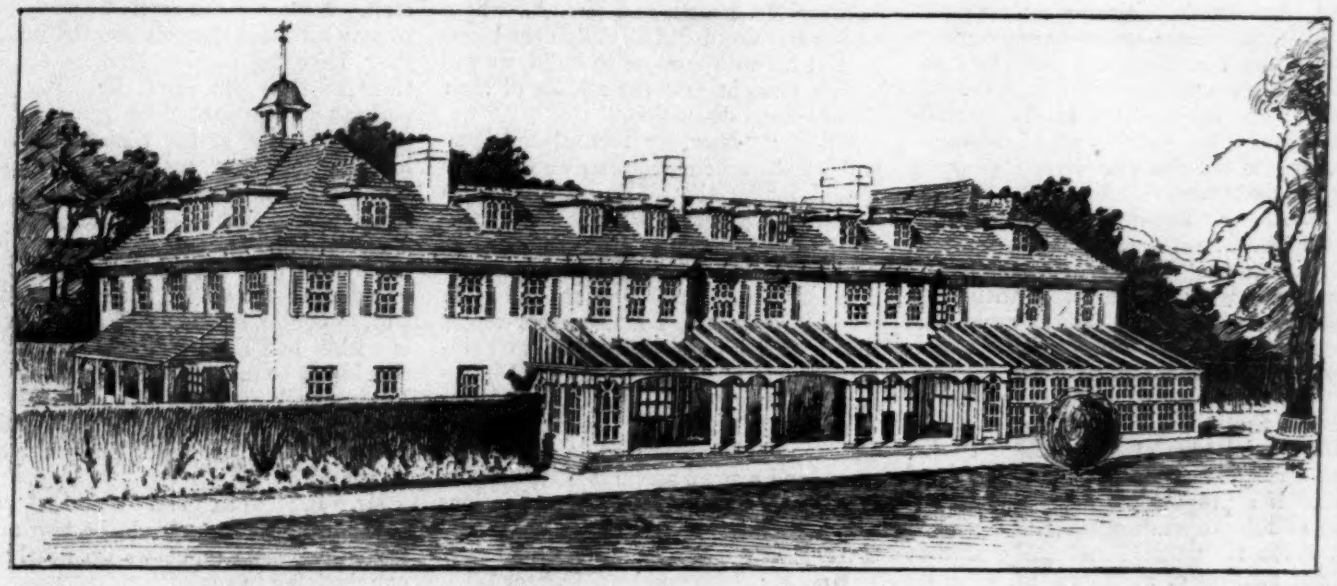


Shoreham Cottage, Shoreham. (*See page* 769.)

Messrs. Moscrop-Young & Glanfield, Architects.

THE ARCHITECT'S CLERK.

WE have already made some brief comments on the papers read at the R.I.B.A. anent the responsibilities of architects, pointing out the difficulties these throw in the way of an architect devoting due attention to his functions as a skilled designer and the detrimental influence all these responsibilities must exercise on the quality of his work.

Yet the architect dare not neglect them, being forced in the protection of his livelihood to guard against the liabilities they entail. If his staff is well organised and well chosen some relief will be afforded, but the faculty for carrying organisation to a high pitch is not usually a marked characteristic of the artistic or professional classes; besides, there is the added difficulty of the fluctuating nature of the architect's employment—one year he may have to cope with a large amount of work and the succeeding one with not a quarter the quantity, and his usual method of dealing with these variations is the employment of a larger or smaller number of assistants in the drawing office, relying on himself for the conduct of the business side of his professional work. Many an architect must have felt that he would be much better off with a capable business assistant than with one or more draughtsmen, whose work he would prefer to do himself had he the time, knowing that he could carry his ideas further with the pencil in his own hand. Some few have been able to put such a system in operation in their offices, but these are in a minority owing to the lack of assistants qualified to undertake this side of office work. Now, as we all know, there is a large surplus in the supply of architects' draughtsmen, and the less skilful find it uphill work to make a living. It does not follow that a lack of the facilities of artistic perception and imaginative design carries with it any disability to appreciate the practical conduct of building operations, and if attention were concentrated on these there is nothing to prevent many a relatively incompetent assistant becoming a very competent and valuable "architect's clerk." The qualifications demanded are not so exceptional but that with steady and concentrated application many a level-headed youngster could master them; and if he can be induced to realise that he will really be rendering more valuable service than as a designer it would be to the advantage of all concerned.

There is a real need for a supply of competent architects' clerks specially trained for this position. They would not be required to have any artistic skill, but should understand drawings and all matters involving legal responsibility, such as Building Act regulations, London County Council or other similar requirements, building by-laws, party-wall notices and awards, all matters connected with contracts, certificates, dealings with sub-contractors, etc., the

preparation of accounts and numerous other questions not as a rule presenting especial difficulty, but sometimes apt to be handled carelessly amid the pressure of more interesting work. A training as quantity surveyor or as a clerk of works, supplemented by the other studies referred to, would provide the right kind of qualification, but the knowledge of quantities and of materials, though useful in a small office, would not be essential in a large one, where there would be quite enough to tackle without any duties in respect of these.

We feel sure that many architects would welcome the possibility of being able to engage a qualified clerk to relieve him of all the details that are unconnected with the practice of architecture as an art, and to protect him from careless phrasing that has often resulted in serious misunderstandings. Thus, for example, an architect may say to his assistant, "Smithson will do the wrought-iron work at So-and-So's"; and the assistant may write to the builder, "We have instructed Mr. Smithson," etc. The architect's clerk would write, "We have approved Mr. Smithson's estimate for wrought-iron work; please arrange your contract with him for this work, including the necessary guarantees as to time, payment, etc." Comparison need hardly be made between these two forms of letter in regard to the risk of a dispute cropping up in the future.

Again, a knowledge of architects' charges will often save hours of worry in abstracting diaries and making up accounts, work that is rarely within the province of the usual type of architect's assistant, but which can well be undertaken by the confidential clerk.

Probably we have said enough to prove that there is a fair opening for the special type of "architect's clerk" as distinguished from the assistant, and that if a proportion of those interested in building operations qualified for this position they would materially improve their chances of advancement, while the architect in practice would be to some extent relieved of the bugbear entitled "the newer responsibilities."

"THE WOMAN IN THE CASE."

WE have heard much lately of the contemplated attack on the profession of architecture by the educated woman. We, for our part, feel no inclination to discourage such an attempt. Indeed, the more really competent aspirants there are in any profession the more healthy is its condition; it is only the dilettante and inefficient that lowers its status, and the woman who is prepared to bring the full force of her intelligence and ability to bear on the mastery of this art might conceivably take rank as a competent exponent of it. We think the claim that the physical requirements of the active practice of architecture render the profession unsuited to women hardly carries the weight that has sometimes been given to it, and, putting aside the question as to whether the modern tendency towards the suppression of sex differences is a good one, a question too wide to be argued here, there seems little reason why architecture should not be as open as any other profession to both sexes.

As matters are the woman has indeed exceptional opportunities for proving her ability. There is nothing to prevent her from submitting a competitive design for a town hall or a hospital, and if it obtained the award, what a triumph!—and what purgatory for any unfortunate public body who might be so ill-advised as to put obstacles in the way of her carrying out her design!

However, the woman is as yet but feeling her ground, and has not so far attempted to make good so large a claim; she cautiously and ingeniously points to the long experience she has had in the domestic sphere and to the probability that she is much better qualified than mere man to deal with the problems of the home. Very well, let us take her, for the moment, at her own valuation, and, *à propos* of this, imagine a short interview between the accomplished lady and a prospective client.

Omitting the preliminary negotiations between Mr. Brown and Mrs. A., whom he has now decided shall design the house he and his wife propose to build, we will plunge straight into the middle of their first business discussion.

Mr. B.: "Now, by this schedule you will see the accommodation we think we should get for the 2,000*l.* we propose to spend: Two servants'-rooms, day and two night nurseries, with bathroom and nursery pantry attached. Our own bedroom with large dressing-room and bathroom *en suite*, two double guests'-rooms and two single ones, with one or two bathrooms conveniently placed. Dining-room, drawing-room—large enough for dancing—billiard-room, top lighted. Pantry, which would also do for service-room, and a small servants' sitting-room, with all the usual kitchen offices, spacious and not cramped; the coal cellar to hold a truckload."

Mrs. A.: "Do you keep a motor?"

Mr. B.: "Oh, yes, a small run-about! But still, we are thinking of a larger one. We should want a garage about 20 ft. by 10 ft., and I should like a small workshop attached, as I amuse myself with a lathe and other little carpentering jobs."

Mrs. A.: "What was your idea of the sizes for dining-room, drawing-room, and entrance hall?"

Mr. B.: "Well, our present dining-room is 20 ft. by 16 ft.; a little larger than this would do. But our drawing-room is only 17 ft. square; we should like our new one at least 10 ft. more each way. Of course, we should want a hall we could sit in comfortably."

Mrs. A. (after a pause): "3,000*l.* might just cover the cost of your house, but I doubt it. I could promise that north or east of London it could be built for 3,500*l.*—only, of course, in a simple fashion."

Mr. B.: "Oh, but—oh, no! Jones said he thought—— You know Robinson's house is quite as big, and he only gave 2,800*l.*, with three acres of ground. I have to live in Surrey, and the ground I want will cost 800*l.*"

Mrs. A. (severely): "I do know Robinson's house. Did you know he is trying to sell it?"

Mr. B.: "Why on earth should he want to sell such a charming old house? The Georgian front was just the kind of thing I was going to suggest for ours."

Mrs. A.: "Yes, delightful, isn't it? But I met Mrs. R. in town the other day and heard all about their troubles. Did you know they had to spend 700*l.* when they went in?"

Mr. B.: "No; he only spoke of a little decoration."

Mrs. A.: "I fear he was not quite candid. But as Mrs. R. was not responsible for the purchase she was very much more explicit. The first snowstorm found out all the weak points in the roof, which, even after an expenditure of 160*l.* still gives trouble at times; the servants' wing had no dampcourse—a wicked way those old Georgians had; and the garden, being clay, was often a swamp until they drained it; two bits of underpinning ran away with 90*l.*, and altogether the first year was a troublous one. Then the position of the house, so far from anywhere, while ideal for the master and mistress, with their motor, is regarded in a very different light by the domestic staff. A servant can rarely be persuaded to stay for more than six months, and, as they have to employ five as against three at their old place, Mrs. R., with perhaps a little pardonable exaggeration, says that most of her time is occupied looking for new maids. No wonder they got the house for less than half what it must have cost!"

Mr. B.: "Yes, I see. I suppose it is hardly fair to expect to get a new house on quite that scale for the same money. But, of course, as the site I have in view is within half a mile of the station we should not be in quite the same fix as the Robinsons."

Mrs. A.: "Don't be too sure. Didn't you say that it was open common nearly all the way?"

Mr. B.: "Yes, and a large park beyond, so that we should be two miles from the village; but we do nearly all our shopping in town."

Mrs. A.: "You must take the risk. After all, you cannot be expected to make your staff the sole consideration. By-the-bye, what number do you employ?"

Mr. B.: "Cook, house-parlourmaid, and nurse, gardener two days a week. That would do, would it not?"

Mrs. A.: "Yes. I should have a poor opinion of my capacities if I could not devise a 2,000*l.* house to be run by this staff. But, of course, we have not yet settled whether the house you are going in for is to cost 2,000*l.* or 3,500*l.*"

Mr. B.: "Well, 2,500*l.* is the outside limit. I don't know what we can cut out."

Mrs. A.: "If you will leave your schedule with me I will go carefully through it and make my suggestions."

Mr. B.: "Anyway, I suppose the billiard-room would have to go?"

Mrs. A.: "We might get it in the roof, or make the hall big enough; but unless your wife is very keen on it she will probably say 'No' to the latter scheme."

Mr. B.: "Yes, I must talk that over with her."

We will drop the conversation at this point and leave it to our readers to decide how far such a discussion would indicate a special feminine faculty in the practice

of domestic design. The purely architectural side of the question has been intentionally ignored, as it would be going over ground that has been traversed again and again. Whether the feminine mind possesses an imaginative faculty in the fine arts only needing the necessary education to develop it is a matter on which the evidence is too conflicting to justify a definite decision; but as we have not enough really imaginative geniuses to undertake the work of providing comfortable homes for all who are prepared to build them this question may fairly be disregarded in considering the claims of women in domestic work.

It has been argued that the woman who takes up a profession must of necessity do so in the same whole-hearted way as a man to the neglect of any domestic training, and that she would in that case be on exactly the same footing in regard to domestic experience, and therefore her claim to superior capacity in this respect would fall to the ground.

If all our procedure were governed by strictly logical rules this argument is quite sound, as, given a man and a woman of equal ability, they must both, to achieve an equal degree of professional skill, devote the same proportion of their time to professional studies; but as no two persons are of exactly equal ability, and as very few have no interests outside their professional work, the contention we have referred to is inconclusive. It is quite likely that the man is giving part of his energies to some civic duty or some favourite sport, and the woman may recognise to a similar extent the claims of domestic duties. Thus, we may yet see the domesticated woman practising as an architect.

NOTES.

London University. THE fourth Report of the Royal Commission on University Education in London deals with the question of housing London University. In the opinion of the Commissioners it is essential that no scheme can be put forward unaccompanied by a proposal to provide a site and buildings more convenient than those now occupied. Regarding the University as a great public institution it demands for its headquarters permanent buildings appropriate in design to its dignity and importance, and specially constructed for its purpose. The Imperial Institute does not fulfil these conditions and lies too far west; besides having never been associated with the University in the minds of the public, it possesses no dignified public hall such as the McEwan Hall, in Edinburgh, or the Whitworth Hall, in Manchester, nor has it suitable accommodation for the Senate, for Committees, the principals, and the headquarters' staff. Neither does it provide for meetings of Convocation and the graduates and officers attending them. In addition, accommodation is desirable for a Union Club house, headquarters for the Officers' Training Corps, and rooms for professors, graduates, and students. The question as to whether a central library is desirable is left open, but in regard to this and provision for more advanced studies it is felt that something beyond that provided in the various constituent institutions ought to find a place in the central buildings. Taking all these points into consideration, it is definitely recommended that immediate steps should be taken to find a suitable site of sufficient size to allow a large measure of freedom in determining the nature of the building to be erected, and the production of the Report has been accelerated in view of the limited opportunities for obtaining such a site in a central position. No particular district is indicated; possibly the Surrey side of the river might afford such a site as is foreshadowed in the report.

The Wellington Monument in St. Paul's Cathedral. THE monument to the Duke of Wellington will shortly be completed by the erection of the bronze equestrian statue which Mr. John Tweed has sculptured from a model he prepared a few years ago, based upon Alfred Stevens's original sketch-model and pen-and-ink drawing preserved in the Victoria and Albert Museum. In our issue of May 28, 1910, we published illustrations of the monument as it then appeared with the trial model in position and contrasted with this a sketch of the original design used by Mr. Rickards in his paper, when comparing the more plastic treatment first intended by Stevens, which was subsequently abandoned in favour of the less satisfactory one with its four pediments that we now see. Our number of January 6, 1894, contains a view of the monument taken just after its removal, mainly at the instance of Lord Leighton, into the second bay of the nave arcade (north) from what is now the Chapel of the Order of St. Michael and St. George.

The Guildhall Improvement Scheme. PLANS have been prepared by Mr. Sydney Perks, City Surveyor, for rebuilding, at a computed cost of some 50,000*l*., the offices on the east side of Guildhall-yard, including the Irish Chamber (1825). The intention is to provide better accommodation, upon a site which extends as far as the "Guildhall" Tavern, by means of three galleries, each 70 ft. long, with several smaller rooms, for the Art Gallery in the upper floors of a new block to contain the Lord Mayor's Court, Irish Chamber, and other business departments. The entire scheme embraces the west side of the yard as well, where are now the Guildhall Justice Room and the offices of the Remembrancer and the City Solicitor above. The buildings on the east side occupy the sites of the collegiate church of St. Mary Magdalene and All Saints (north), and the adjoining Blackwell—more correctly Bakewell—Hall (south). With the Hall was incorporated the library—the first free library founded in England—which Richard Whittington's executors built on the south side of the church. Rebuilt in or about 1588 and again, after the Great Fire, Bakewell Hall had a west façade 105 ft. long, with a bold, overhanging cornice and pediment supported by carved modillions. In 1820 the Hall gave place to the (old) Bankruptcy Court, designed by William Fowler. In 1823 William Mountague, City Architect, built the (old) King's Bench (Lord Mayor's Court) and Common Pleas, the former taking the site of the Guildhall Chapel, between which and the Guildhall lay Cut-throat Alley (see a plan in the *Builder* of June 4, 1910). The chapel was built by the Frowyks as London College, and dedicated to St. Mary Magdalene and All Saints in 1299. It was rebuilt in 1451 as the Church or College of Guildhall; it served latterly as a Court of Requests.

The Architectural Problem. MR. SYDNEY PERKS, who is responsible for the restoration of Dance's front on the north side of the courtyard, has set himself no easy problem in respect of the treatment of the east and west façades. The existing front has, of course, an historical interest, which excuses much that can hardly be regarded as admirable from any other point of view, and one would scarcely desire to see two more façades of Dance's "Batty Langley" Gothic. At the same time, some sort of harmony should run through and link up the three façades, in order clearly to indicate that they belong to one and the same building. Perhaps this could best be done by keeping the general treatment on broad and simple lines, introducing an echo of Dance's fanciful conception in terminal features at the south-east and south-west corners. We shall look forward with interest to the architect's solution of this exceptionally difficult problem.

The Care of Art Treasures. MR. EDW. HAMILTON BELL writes to the *Times*, in answer to the customary "outcry" concerning the removal of works of art to the U.S.A., to point out that really from the point of view of civilisation as a whole it is perhaps a good thing, as they are so much more zealously guarded—and, we may add, displayed—in that country. He animadverts on the management of Hertford House, instancing the wiring for electricity of the great chandeliers and the wanton exposure of the jasper perfume-bearer of Gouthière, known as "La belle coupe." And certainly it seems as though this and other objects of "virtu" might suitably be enclosed in airtight cases to guard them from too appreciative fingering and the corrosive effects of our deplorable atmosphere.

Our Next Issue. OUR New Year's issue will be, as usual, a special one, and it will be as attractive as its predecessors. Suggestions will be given for an "Imperial London," supplementing to some extent the drawings published in our first number this year. The development of the Surrey side of the Thames will be a feature of the scheme. Otherwise the issue of January 5 will be important. With illustrations by Mr. Henry C. Brewer, Mr. W. Walcot, Mr. Adrian Berrington, and Mr. A. C. Conrade, the pictorial side will be well represented; while reproductions of the work of Signor Angiolo Zanelli, the Italian sculptor, will give further interest to the beginning of our seventieth year.

ARCHITECTURAL SOCIETIES.

Nottingham Architectural Society: The Law Relating to Building Schemes.

A GENERAL meeting of this Society was held on Tuesday, December 12, at the rooms. Mr. L. Y. Harris was elected an Associate.

Other business being disposed of, Mr. W. H. Taylor, Fellow of the Surveyors' Institution, Licentiate of the Royal Institute of British Architects and Barrister-at-Law, read the following paper, entitled "Some Notes on the Law Relating to Building Schemes":—

"There are several factors at work at the present time which may eventually give an impetus to the development of land for building purposes, namely:—

1. The Finance Acts of recent years.
2. The Housing and Town Planning Act, 1909.
3. The Garden City movement.

In districts where the balance between supply and demand is favourable.

And, although the second and third of these factors will doubtless tend towards the production of more comprehensive schemes in the future than have been projected in the past, owing to certain restrictions being removed which hitherto have retarded the work of development, yet I think architects and surveyors in whose hands the actual organisation of the work of development will lie may possibly be in some danger of overlooking the fact that notwithstanding that the conditions under which development will take place are changing, yet the law relating thereto is in many directions stationary, and more particularly on points which have a deterrent and hampering effect.

The broad general principles of the law affecting development schemes are quite well known and understood. It is when one descends to individual cases that one not infrequently finds these general principles difficult to apply; and also that they are often of a seemingly hampering and vexatious character, restricting the natural rights of the owner and circumscribing the range of the designers' scope; and when one is confronted with such cases one is tempted to a feeling of outraged liberty, forgetting that what appears to be a hardship on the individual is generally for the benefit of the community.

I propose to put before you a few points in relation to development schemes and the erection of buildings which have often been a source of trouble to the architect in the past, and most of which will again and again turn up in the future, despite the trend in modern methods of development and building and in legislation relating thereto.

One is apt to be so obsessed with the general lay-out of the work in hand as to overlook the small points which not infrequently render the whole scheme abortive, or at any rate involve an entire recasting after much work has been done and time spent.

These points may be considered under three heads, viz.:—

1. Laying out new streets.
2. Building lines.
3. Air space.

1.—*Laying Out New Streets.*

Where land is brought into the market and laid out in plots for building purposes, it may or may not be necessary to form new roadways where never before the public had any right of passage, but it would be safe to say that in every case there exists on or adjoining some part of the land an existing roadway used by the public; such roadway may be a "street," in the common meaning of the term, or a main turnpike road, a narrow country lane or even a mere occupation road; and, generally speaking, any such road affords building frontage of which the owner is not slow to avail himself and is consequently looked upon as an advantage, when in fact it may turn out to be a source of trouble and expense, for when buildings come to be erected abutting on such old roadway, the owner and his architect are often confronted with an objection by the local authority to the intended use of the frontage on the score of turning the old roadway into a "new street," which new street does not comply to the local regulations as to width and construction, etc.

This question as to when an old roadway becomes a "new street" has given rise to a great deal of litigation, all of which seems to me to have ended with no satisfactory results, for one cannot even now say with any degree of certainty when an old lane becomes a "new street."

Barton *v.* Eccles Local Board was for a long time the leading case on the point, and seemed to establish the rule that an old highway repairable by the inhabitants at large became a "new street" within the meaning of the Public Health Acts when buildings were erected along it; so that where local by-laws required new streets to be 36 ft. wide, and building operations were commenced along a road, say, 24 ft. wide, the owner must throw sufficient land into the road to make up the width to 36 ft., and form and make up the added portion in accordance with local regulations; but, in effect, this case left the question as one of fact to be decided in each instance by the local bench of magistrates.

Following this, in several cases magistrates convicted owners of not complying with the local by-laws, which convictions in some cases were quashed by the Divisional and Appellate Courts, who sought to draw a distinction between cases where there were buildings on the opposite side of the roadway in question and where there were not.

The case of Devonport Corporation *v.* Tozer appears to overrule the doctrine enunciated in Barton *v.* Eccles Local Board, and to decide that the ordinary by-laws as to new streets do not apply to the case of building operations along an existing highway where the latter is not interfered with. It should be noted, however, that this cannot be taken as settled, for this case was really decided against the Corporation because they had omitted to obtain the consent of the Attorney-General to the proceedings.

The case of Smith *v.* Chorley Rural District Council decided that where a local authority have honestly considered plans submitted to them and they have decided that the proposed works amount to laying-out a new street no action for a mandamus to compel them to alter their decision will lie.

The result of this crop of litigation seems to be that where new buildings are being erected at the side of an old road repairable by the inhabitants at large, and there are no buildings on the *opposite* side, such building operations do not amount to laying-out a new street; but that if there are already buildings on the opposite side, the reverse may be the case, though this has not been definitely settled. A building owner is, therefore, left somewhat at the mercy of the local authority, for if they decide that what he proposes to do amounts to laying-out a new street, and he is convinced it is not, his only course is to proceed and to allow the authority to take the first step towards what may prove to be an endless piece of litigation, or to fall in with their requirements.

This is eminently a case where the surveyor to the authority could be consulted with advantage as to his views on the point, where there is any doubt, before much progress is made with a scheme, and so avoid waste of time and labour.

Another by-law relating to new streets in force in most districts runs as follows:—"Every person who shall construct a new street shall provide at one end, at least, of such street an entrance of a width equal to the width of such street, and open from the ground upwards."

To the "man in the street" this by-law means that every new street must have at least one end abutting on some other roadway, and that the line of abutment must be of the full width of such new street. And yet this, which is to me a very plain by-law, has been the bone of contention between authorities and owners in several cases, the former having attempted, and not unsuccessfully, to put upon it a strained, and, to my mind, an utterly ridiculous meaning.

The earliest leading case appears to be that of Hendon Local Board *v.* Pounce—commonly known as Pounce's Case—where the local board contended that by "entrance" was meant "means of access," and that the roadway on to which the new street joined must be also of the by-law width; so that a new street could not be joined on to an old road or street unless the latter was of the width required by the by-laws or was widened to comply with them. Unfortunately the judge in this case adopted this view.

It practically ties up the greater portion of land in country districts served by narrow lanes, if the local authorities so will it.

Fortunately few authorities appear to be taking up an unreasonable attitude on the point, and, in passing, I may remark that the Corporation of this city have a similar by-law so worded that the absurdity does not arise.

Taken in its liberal and proper meaning I do not suppose there is any reasonably-minded person who would object to it, but even then it may in some cases cause great hardship owing to the change in other requirements as to new streets.

2.—*Building Lines.*

The next point in connexion with building schemes which almost every architect must run up against at some time or other, and which often requires very careful consideration, is the matter of the building line.

In entirely new districts where no building has yet been done the building line may generally be at the will of the designer, subject to compliance with any special local by-laws in force. But where buildings are already in existence the architect may find that the building line is already fixed for him, and that such line is in his case a particular nuisance, often restricting the general lay-out and sometimes rendering parcels of land more or less waste and valueless.

Most of the cases which occur in this connexion arise under powers conferred upon Corporations or urban authorities to define the building line, or under the Public Health (Buildings in Streets) Act, 1888, which applies only to urban districts.

With respect to the exercise of the former, any person aggrieved by the action of the authority is generally entitled to compensation, and, although in individual cases the prescribed building line may be obnoxious and detrimental to the owner, still he gets a solatium, whereas the powers conferred by the 1888 Act, especially where they are exercised in an arbitrary manner by the withholding of consent to the building line proposed by the owner for no apparent reason, may result in great inconvenience and loss to him; and should he seek to test the legality of the authority's decision, he will probably learn to his sorrow the really peculiar interpretations which can be put upon the provisions of this Act.

It is commonly thought that any question arising under this Act is one of fact to be determined by the magisterial bench; but when one comes to look into cases one finds some very puzzling results.

One point is that the existing buildings and the new one must be "in the same street" within the meaning of the Act, and it has been held in Ravensthorpe Local Board *v.* Hinchcliffe that for the frontage of two buildings to be in the same street they must be "in some degree of proximity."

This point came up for view in Warren *v.* Mustard, where the justices decided that the two buildings were in the same street, and convicted, and on appeal the Divisional Court upheld their decision, Mr. Justice A. L. Smith saying that with regard to the "question of the buildings being in the same street that was a matter of fact for the determination of the magistrates, and in this case they had determined that the frontage formed by the line of cottages was in sufficient proximity, and whatever he might think of their decision and however much he might regret it and regret the hardship it might cause to Mr. Warren, the court *must* (please note the word) adopt it."

Compare this with the case of Leyton Local Board *v.* Causton, where the magistrates refused to convict, but the Divisional Court reversed their decision.

In the first case it was decided as a *fact*, and being so decided was held not to be open to review, that the building did infringe the Act; whereas in the second case, which would appear to all ordinary persons a clear case of infringement, the magistrates decided as a fact that it was *not*, and then the High Court interfered with that finding.

In connexion with the question of the building line, I should like to draw attention to a case recently reported in the *Manchester Guardian*, and also in the *Builder*, which touches the architect very closely—in fact, touches him in his tenderest part, viz., his pocket.

Shortly, the facts were these. An architect was suing in the County Court for fees for preparing plans for the erection of some shops. He prepared the usual copies for depositing with the Corporation, who, after keeping them six weeks, intimated they could not pass them, as they intended widening the street by 15 ft. The defendant owner had seen the plans and had approved them.

"Owing to the decision of the Corporation as to

the widening the plans were rendered useless, and the defendant refused to pay for them, contending that the building line was one of the most important points an architect had to comply with, and that it was the architect's duty to ascertain definitely where that line was before proceeding to draw the plans, and that if he neglected to do this he proceeded with the plans at his own risk; in the end the judge adopted this view.

At first sight I was tempted to regard the result as unjust, but when it appeared that the architect knew beforehand that a widening was in contemplation but not definitely decided upon, my sense of injustice was lessened, as any careful man would have endeavoured to have arrived at a definite line with the Corporation before proceeding with the complete plans, and would have obtained his client's instructions to negotiate, for which, of course, he could have claimed payment.

3.—*Air Space.*

Having successfully negotiated the obstruction known as the "building line," an architect may in ninety-nine cases out of a hundred fire away with his building without encountering further obstacles, but on the hundredth occasion may be unlucky enough to be caught in a trap with respect to air space. There is no necessity for me to detail the usual regulations as to air space about buildings, for they are pretty straightforward and seldom give rise to much difficulty. Unfortunately, however, the man who first drafted this rule would appear to have belonged to the fraternity of those who believe the world is flat in the literal sense, and to have been unaware that buildings are at times erected on a hillside.

Some years ago I had to deal with the question of air space in connexion with a building erected on a hillside. The circumstances were as follows:—

Plans of the house were submitted to the local authority, on which a level space of about 7 ft. was to be excavated at the back, and then a retaining wall about 4 ft. high erected to uphold the garden. The authority refused to pass the plans unless the hillside were excavated for 15 ft. from the back wall of the house, the latter being of such a height that an air space of 15 ft. wide was required by the by-laws.

This contention appeared ridiculous, and after considerable delay, filled up by argument with the Council's surveyor, the Council eventually gave way, and I for a long time was under the impression that the Council were legally wrong in their contention. In 1907, however, the case of Holroyd *v.* Healy's Breweries was fought out, where the circumstances were somewhat similar, except that the back wall butted up to the hillside and that the building was a suite of offices.

The magistrates convicted the owners of a breach of the by-laws; on appeal by a majority of the Court this decision was upheld. It is curious to note that all three judges described the result as ridiculous, Mr. Justice Darling remarking that as the by-law stood he did not see any use in the air space at the back, as a privy and ashpit might be erected on it, and there was nothing prohibiting these erections covering the whole space.

I believe the constructions put upon the by-law as to air space I have just described are not generally adopted on the one hand by the Councils, and on the other by owners, and I hope nothing I have said will incite anyone present to attempt to put such construction into practice."

A number of interesting points were brought up in the discussion, in which most of those present too part, and at the close Mr. Heazell proposed, and Mr. Gill seconded, a vote of thanks to Mr. Taylor for his instructive paper. Mr. Maylan supported this on behalf of the visitors, and also thanked the Society for their invitation.

WHITECHAPEL ART GALLERY.

Mr. Gilbert A. Ramsay has been appointed Director of the Art Gallery *vice* Mr. Charles Aitken who was recently appointed as Keeper of the National Gallery of British Art, Millbank. Mr. Ramsay was a pupil of Mr. William Leiper, R.S.A., and of the Glasgow School of Art. He was elected Master of the Junior Art Workers' Guild, 1911-12. In 1910-11 he was assistant to Mr. Aitken, and acted as Director in 1911.

SHOREHAM COTTAGE, KENT.

THE design of the alterations and additions now being carried out has been influenced by the existing portion of the house, which was built in the latter part of the XVIIIth century, and is a good example of the quiet and unobtrusive type of house of the period.

The limitations of the site and the accommodation required for the additions necessitated a practically square plan. All the reception-rooms and best bedrooms have been planned to face south-west, with an outlook over the small River Darenth (which runs through the grounds) and across to the neighbouring hills.

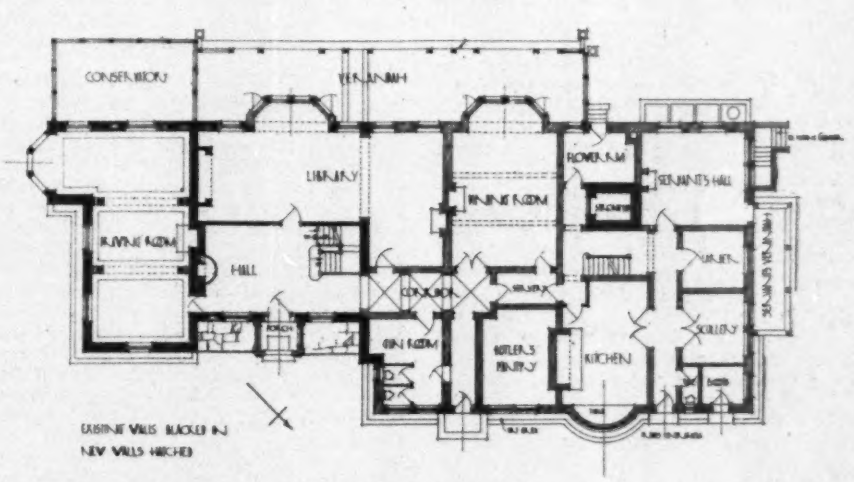
In order to keep the existing line of roof (a condition stipulated by the client) a large flat, carried out in reinforced concrete, is to be built, supported on 9 in. walls, and cantilevered over to hold the ends of the rafters of the tiled roof.

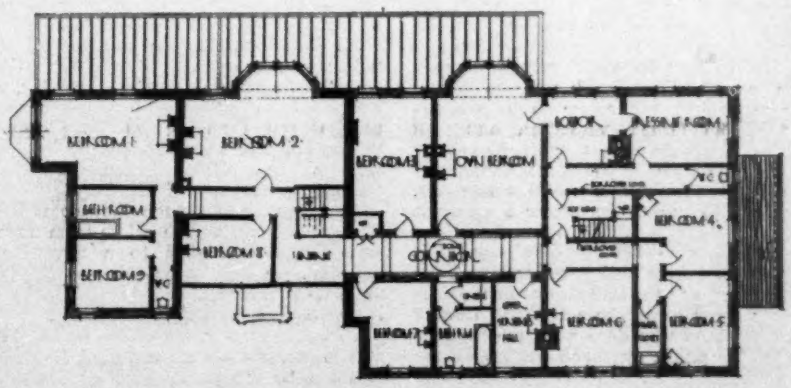
The hall is to be panelled with some genuine old Jacobean panelling, the property of the client, while the corridor leading from hall to dining-room is to be carried out in a similar manner, with a groined vaulted ceiling. The floor joists over the dining-room are to be of light oak moulded. All the mantelpieces have been designed by the architects in character with the house.

The walls are of stock brick covered with 1½-in. cement rendering, while the cornice is of wood painted white; the tiles are partly taken from the old portion of the house which has been pulled down, and partly old hand-made sand-faced tiles. The exterior woodwork of the dormers, cupola, and windows is to be painted white.

The general contractors are Messrs. Holliday & Greenwood, Ltd., of Brixton, the ferro-concrete roof on the Indented Bar System; electric lighting and plant by the Edmundson Electricity Corporation, Ltd.; heating by Messrs. Cannon & Co.; strong-room fittings by the Bramah Lock Company; and lift by Messrs. Waygood.

The architects are Messrs. Moscrop-Young & Glanfield, Licentiate and A.R.I.B.A., of 20, Brook-street, Bond-street, W.





Shoreham Cottage, Shoreham.

Messrs. Moscrop-Young & Glanfield, Architects.

D

THE ÆSTHETIC TREATMENT OF CONCRETE.

AT the seventeenth ordinary general meeting of the Concrete Institute on June 7, in the Lecture Hall, at Denison House, No. 296, Vauxhall Bridge-road, S.W., Professor Beresford Pite read the following paper on "The Æsthetic Treatment of Concrete":—

"I suggest, without any intention of humour or hypercriticism—and at the present stage in the study of design for concrete one can only venture to suggest, fearing to dogmatise—that the simplest and directest royal road to ultimate artistic and architectural success in this material will be to eschew the process implied by the title of my paper. To this end, which is of course by way of preliminary canter, I would beg you to endeavour, first, to remain in practical ignorance as to the proper meaning of the word "æsthetic"—this will not be difficult—and then to persuade you, if you possess a glimmering of its implication, together with a fuller comprehension of the almost limitless possibilities of constructive form attainable in reinforced concrete, that to relate so abstract a term as "æsthetic" with anything like "concrete," by means of the process at once mental and physical, which is implied by the word "treatment," had best be avoided, if it is at all possible under the circumstances in which you, as a constructor, may be placed.

That artistic satisfaction and ultimately an architectural development upon settled principles wait upon the honest and direct expression of constructive purposes and forces should not need demonstration. The construction of any direct and serviceable machine or building may be beautifully achieved without invoking consciously, in the slightest degree, the operation which we call æsthetic treatment.

Abundant illustrations have been offered of admirable accomplishments of difficult and novel constructive feats in reinforced concrete which are satisfactory without provoking artistic or critical consideration.

Such sensations of pleasure produced by mechanical skill are closely allied to the presumed æsthetics of beautiful design, though

unconsciously and necessarily free from all academic standards or canons of architectural style.

Surely not far removed from the success of a gigantic reinforced concrete silo or culvert is that of the ancient fireproofing by means of a stone vault on a great scale of our English cathedrals. A small and deeply interesting early example, to which æsthetic purpose cannot legitimately be imputed, is the plainly constructed Norman chapel of St. John in the Tower of London. The constructive steps thus attained are simple but pregnant developments of building skill, which developed without a break in four centuries into the elaborate æsthetic treatment of the vault of Henry VII.'s Chapel at Westminster.

If it were possible we would gladly surrender the necessity of discussing the æsthetic treatment of concrete and rely upon the common practical sense, which is Philistine to the uttermost, and knows only art as the contents of picture-frames and pedestals. If reinforced concrete design could be left to the artistic ignorance of engineers, rather than to their imitative instincts, such a development of concrete design might come to us in as few generations as came through the masters of the mason's craft throughout North Western Europe during the four centuries which succeeded the Norman Conquest.

But we do not live in the past, though upon it; and are necessarily part of the world to which an architectural or æsthetic semblance has importance. Architecture in her styles is a harmonic treatment of form, and whether there is recognisable music in the expression of natural forces or not, the note around us is contagious, and we cannot but echo it, parrot-like, until gifted with a mental perception of the meaning and purpose of the forms we repeat. To the architecture or æsthetic treatment of concrete we must therefore give heed.

For some considerable time the æsthetically minded have desired an original style of architecture. They feel sure that those antiquarian reproductions which by so many are called designs incessantly fetter true artistic inventiveness.

This longing it at once natural and unreasonable, because repeated features and ornaments do become tiresome, and because, do what we will, we cannot be otherwise than ourselves, and that is to say be original.

To the jaded architectural imagination the advent of a novel system of construction in a practically new material suggests an opportunity for that freshness of design which will fulfil the hope of seeing an original style spring into being.

Welcome to the new constructional motive and material is at any rate secure amongst these progressive artists. Has not their opportunity at last come?

But the question immediately arises whether the provision of a new material and the application of novel methods of construction are in themselves sufficient to produce original æsthetic design, fresh in any refreshing sense, having attractiveness and elemental beauty.

We will grant at once that the new building will be strictly true to its principles, and unmistakably express itself as having the thinness of reinforced concrete with unaffected realism. It shall be built in truth, but the problem remains to design it with beauty. Truth as to material, by which we have learnt to mean without imitativeness of any other material such as marble or brickwork, and truth as to the structure of its design, by the avoidance of unreal features of constructive import. Both may be present in all simplicity and sincerity, but it may be confidently prophesied that an æsthetically affected and backward-looking generation will refuse to be satisfied with such unadorned veracities, and will repeatedly demand beauty until something sweet, with the taste of which it is thoroughly familiar, has been stirred into this simple fare, like sugar with mortar in winter to prevent freezing.

This sweetness to the eye of the world is the subject for our present consideration. No artist can exist, and the architect as little as the musician, in any other character than that of a public nuisance who does not tune his harmonies for the public approval, and appreciate his unremunerated responsibility to the community when building his personal imaginations for the public gaze and common weal.

The architect, therefore, sets about his task of producing pleasantness of aspect, and, guided by an instructed instinct, he collects ideas bee-like out of the material of precedents and motives in the world around him. This collecting, observation, and reproductive design are closely connected, for variation of design is related to quality and quantity of observation almost though not quite always.

But before we further consider the most practical aspect of the subjects for students, namely, from what fields can these precedents and motives for the æsthetic treatment of so novel a construction as reinforced concrete be collected, we must briefly state a few conclusions which summarise the architectural principles involved. The premise must be first made that over all building which assumes nobility or claims permanence the laws of the mistress art of architecture most assuredly hold. Unless these two qualities of high appeal and of endurance are sacrificed—and it cannot be that any concrete building need be at once mean and temporary—no exception can be pleaded to those laws or principles of architecture which are manifested as imperative from the Great Pyramid onwards through the building history of the world.

This assertion of high aim, coupled with permanence, is perhaps the more necessary to-day to deliver us from the consideration of the fascinating and practical subject of exhibition buildings. It is difficult, extremely so, to judicially settle the claims of a great class of constructions purposely endowed by æsthetic treatment with a wide popular appeal to consideration as works of architecture. This task cannot be enlarged upon now—reasons for judgment on the White City are deferred—but the rule holds for all our constructive work that permanence is a vital quality to real architecture, and that ephemeral building aiming at merely pictorial or histrionic ends must justify itself on shallower grounds than permanent concrete building.

I. There is no common artistic sense or experience which will enable the educated and cultivated world of to-day to accept the native and naked facts of a reinforced concrete building of ordinary purpose, such as a warehouse or office block, as anything else but barbarous, apart from some harmonious relation to and reflection of traditional architectural forms and proportions which by long usage and historic meaning have established themselves as alphabets and symbols of artistic expression in the building arts.

Proportion in the abstract as good or bad is easy to talk about; it may be poetical, but is difficult to embody and unpractical. It would be idle—and this subject is a delightful *corpus vile* for exemplification—to direct an architect that his reinforced concrete building must be simply true to its material and purpose, and rely only on good proportions for success and artistic effect. There is a good deal of professional and critical cant to the tune of the sufficiency and pre-eminent importance of good proportion. Let us suggest a simply corrective question. What is the canon of proportion that the prescriber specifically has in his mind's eye? If it is an indefinite perceptive sense of fitness please apply it forthwith to this concrete case, wherein the height of every floor and practically the size and shape of every opening in the walls is settled by canons of use and practicability—whether warehouse, hospital ward, or mammoth residences.

Queen Anne's Gate Mansions, Westminster, may, with all due respect to its inhabitants, be suggested as a sufficient example of proportion settled by practical canons without reliance on architectural style or ornaments.

II. Therefore, in the absence of artistic power to educe beauty out of the utilitarian factors of reinforced concrete building, we are compelled to adopt and adapt those past architectural forms which have canons of proportion and have attained by long acceptance a force of expression. These architectural forms are of age-long growth and development, and though they come to us in stone and brick, and therefore seem unsuitable and unreal if applied to a novel artificial material, we have none other with which to make that public appeal for sympathy which is the basis of the artistic sentiment.

To put it crudely, the classic forms of Greece and Rome, the Gothic forms of England, the Renaissance treatments of Italy are, after all, the staple of the only possible architectural treatment of the reinforced concrete architecture to-day.

III. A third brief conclusion is that the application of colour, whether in simple tones or various patterns, to the surfaces of concrete buildings, though such treatment may be purely æsthetic, will not suffice as a satisfactory or as an architectural solution of the problem.

The concrete mass necessarily has colour of some sort, whether perhaps the grey of a cement or the pink of an aggregate. This colour quality, which may be said to be native, may be modified for æsthetic purposes, but it really appertains to the texture of the building, and belongs to another branch of this subject. The propriety of securing an even consistency of tone or a clean contrast between applied cement dressings and the general surface of the wall is, however, to be mentioned here. The application of colour implies a direct intellectual exercise in æsthetics of considerable range. It also involves differences of colour material, though essentially between the red and white colour-wash bands of a sunlit Oriental front and the marble veneers of a mediæval Venetian palace there is little difference of æsthetic treatment. Each method is obviously applicable to walls of any core, from Babylonian earth mounds to reinforced concrete partitions.

The æsthetic treatment of concrete would soon be settled and its practitioners assigned positions in schools of painting and decorative art if a superficial treatment were sufficient, whether in economical distemper or costly marble and ceramics. Imagination will soon fly to the Baghdad markets for tile and to Byzantium for mosaic, and neither association nor scope will be lacking.

But how in any scheme of superficial decoration shall we deal with the new problems of plastic form and design? Colour may be a palliative, an enrichment of surface, in that it accepts, and does not control, the forms of the building to which it is applied. Its application does not deal with the greater principles and factors of architectural effect, those of proportion, of light and shade, of grouping, and of ornamental detail.

IV. A fourth conclusion is that in texture alone, that is, in the quality of the surface, lies the ultimate differentiating quality of the æsthetics of any building material, and especially of ferro-concrete. The architectural elements of a style may all be simulated in stucco as if of stone, even to the reproduction of pseudo-constructive jointings and of such originally economic mason-craftiness as rustication. The vital æsthetic difference is that of the texture. The simulation may extend to the superficial elements, but when detected, as it inevitably will be, under the stress of natural forces, the æsthetic value is sensibly lessened, and with the repulsion of artistic sense and sympathy condemnation follows.

The texture of native materials has a special beauty; that of artificial materials, as of brickwork acquired by craftsmanship, both of manufacture and of laying and bonding, also has intellectual interest.

It is to this essential or native character in concrete that we must look for its expression of texture. Though there is a touching interest in the impress of the timbering on the concrete work of the Roman Emperors, modern fancy shuttering cannot be suggested, for there will be no lasting result from mere sporadic impulses of imagination. The creation of rusticated joints by sinking moulding fillets, or such like methods of creating a surface design, need not be even proposed, for texture is that element which is solely necessary to, and therefore indispensably connected with, a certain material, and by which you may identify and appraise it. It applies not merely to the detailed description of smooth, joined, or rusticated treatment of a cement surface but to the character of the area, its extent, and the necessary absence or presence of jointings, and other evidences of construction.

The influence of texture is mainly felt in the design and treatment of ornamental detail. The relation of material to design compels attention in such ornamental details which involve consideration of facility or difficulty of execution. A hard and intractable material naturally restrains the mouldings and carvings which are designed for execution in granite, while the surface of a pliant, easily-wrought brick or stone wall suggests enrichment and delicacy of moulding.

The suggestiveness both of modelled or cast mouldings and enrichments in plaster is also of a different character, and this difference is the texture.

Modifications of form in the drawing of detail owing to increased ductility of the material should be welcomed and insisted upon as emphasising a characteristic which it is foolish and timid to disguise.

The absence of building up joints is alone sufficient to afford a fine speciality to concrete design. The jointing of stonework, originally a painful necessity, as the ancient use of monoliths shows, has become an artistic resource of great value, artificially rusticated joints bearing evidence to this fact. The value to scale of such jointings is primary, but their relation to texture is certainly not to be forgotten.

In concrete we have now monolithic walls, and this is fact and texture at once. The other quality of scale, lost through the absence of jointing, will have to be recovered by other architectural factors of detail.

The summary of the brief conclusions that we have stated on this subject of unusual magnitude is negatively that:

I. We have found no instinctive guidance towards an unbiassed and fresh originality in the æsthetic treatment of both a novel building material and principles of unusual application.

II. That invocations of good proportion or of other abstract principles, though useful as weapons of criticism, are similarly of no assistance in creating a system of design.

III. That superficial colour treatments are insufficient for architectural expression, though valuable in assisting æsthetic effect.

IV. Positively that the texture of concrete surfaces modifies and imparts special character to any forms employed for architectural purposes.

Therefore, while modern considerations of utility and of novel constructional methods determine the proportions and may spontaneously, or subconsciously, if this may be proposed, develop qualities which require an æsthetic character, the only method by which definite progress in an architecture of concrete will be possible to us is by the scholarly and critical employment of the traditional plastic forms of architecture modified by and adapted to execution in concrete; and this is its æsthetic treatment.

We must, therefore, undertake a short review of the development of some of these traditional forms, and note the sources and purposes of their origination.

Encouragement in our researches will await us. There are enough flowers in the world-wide garden of architecture for any collector of æsthetic motive or effect. But to extend the field in any universal way is both needless and unwise. The flowers are around our feet, familiar enough and offering ample material both for imaginative design and popular comprehension. The current architectural detail of stone or brickwork which finds expression in spite of translation from native into artificial building materials is all we need if we will face the problem, really one of the perception of artistic adaptability and of refinement, of texture, that is of the essential relation of the material to the forms into which it is moulded.

Egypt and Greece will furnish us with architectures in stone the æsthetic elements of which are derived indirectly and idealised from other materials. Rome will show us the application of merely architectural forms for æsthetic purposes, while in the mediæval building alone in stone and the kindred crafts shall we find a direct æsthetic development coinciding with constructive progress.

Egypt.

It is of singular interest that one of the earliest known architectures of the world, that of the Nile Valley, has in constructive principle a reinforcement of a weak concrete walling. The original Egyptian dwellings were built of mud strengthened by a systematic reed structure.

The sloping surface of the thin walls, the plaited reinforcements at the angles and at the crown of the wall exemplify in a crude form the principles upon which we depend in the design of reinforced concrete.

Then the salient forms of this reed and mud architecture of between five and six thousand years ago in the course of generations crystallised by means of painted representations into an idealised system of design having sacred associations and acquiring an æsthetic quality which was not present to its originators.

These forms are ultimately employed probably after more than a thousand years, frankly to condition the structure and decoration of that most opposite of building materials, Egyptian granite, and under structural conditions and by methods which are a subject of wonder and admiration to moderns. In the result of historic action the non-æsthetic reed and mud architecture becomes, in a material foreign to its constructive conditions, the standard and source of a grand architecural style.

A translated future may thus await the unabashed directness of non-æsthetic concrete building, an aspect of the subject excluded by our title.

Greece.

A similar transmogrification from a utilitarian construction of wood into an æsthetic architecture of marble evolved itself in the progress of Greek building art. The crude and practical modern post and lintel structure of the pre-Mycenean age, with its necessary framings, templates, and panels develop, when translated into the more enduring but less ductible marble, into the graceful order of column and entablature, having trigylphs and metopes, abacus and echinus.

The attainment of perfectly artistic craftsmanship spontaneously generated a sense of æsthetic system in the age-long development of the Ionian and Dorian architecture of the Greek world seems to be evident.

The original constructive system becomes idealised in Egyptian architecture, probably through the medium of painted representations of the original types, and in Greek building through the development of a singular and pure power of drawing—that is, of perception of abstract beauty in form. The original method grows crude and barbaric as the refined representation of it develops, and slowly the world becomes possessed of definitely original types of architecture, both having this common element, that they are æsthetic treatments by translation into an alien material of an originally non-æsthetic system of building.

Rome.

Rome seems sensibly nearer to us in her likeness to the general conditions of our own building life. Her genius is expressed in vast works of engineering skill, such as the great Thermæ, the Flavian Amphitheatre, and the Pantheon. It is, of course, to the point, though time does not permit for its thorough discussion, to instance the Roman system of reinforced contruction of vaults as containing and illustrating the principles of a concrete architecture. The elucidation of the æsthetic quality from this architecture will illustrate the unconscious æstheticism of gigantic masses and of curved lines of great scale; this I would venture to define wholly as engineering. The conscious æsthetic treatment—which we may assign to the artist—is in Roman work of a superficial and unrelated character, and upon the discernment of this the architectural critic exercises his vivid and forked lightning. This superficial treatment consists in the non-functional application to the concrete building of foreign, to wit, a Grecian order of architectural expression. The relation, or want of it, between these æsthetic treatments and the building, both as to mass and material, is exemplified with singular completeness by a state wedding-cake. The internal mass is of concrete, the external adornment of a white cementitious material, sweet to the taste, in which ornamental forms are created, often taking a direct architectural and Roman semblance. Our title as a phrase exactly describes the result both of Roman architecture and of this confectionery as an "æsthetic treatment of concrete."

The development of the Grecian method of covering wrought stonework with a thin coating of plaster into the system of plaster work decoration employed, originally for interior by the Romans, opened the way to the reproduction of architectural forms entirely divorced from constructive obligation; and later on, through the Renaissance of Roman architecture in the XVth and XVIth centuries of our era, this became a popular and economical means of æsthetic treatment.

The Roman reliance on a foreign type of architectural ornament detached from its constructive purport may seem in the light of the "Seven Lamps" to be unworthy and vain, but it continues even to-day to dominate universal civilisation, and the entablature cornice and typical capitals employed by ancient Rome are still the ensigns of her architectural empire among the northern barbarians throughout the colonies of their descendants and the world which learns from them.

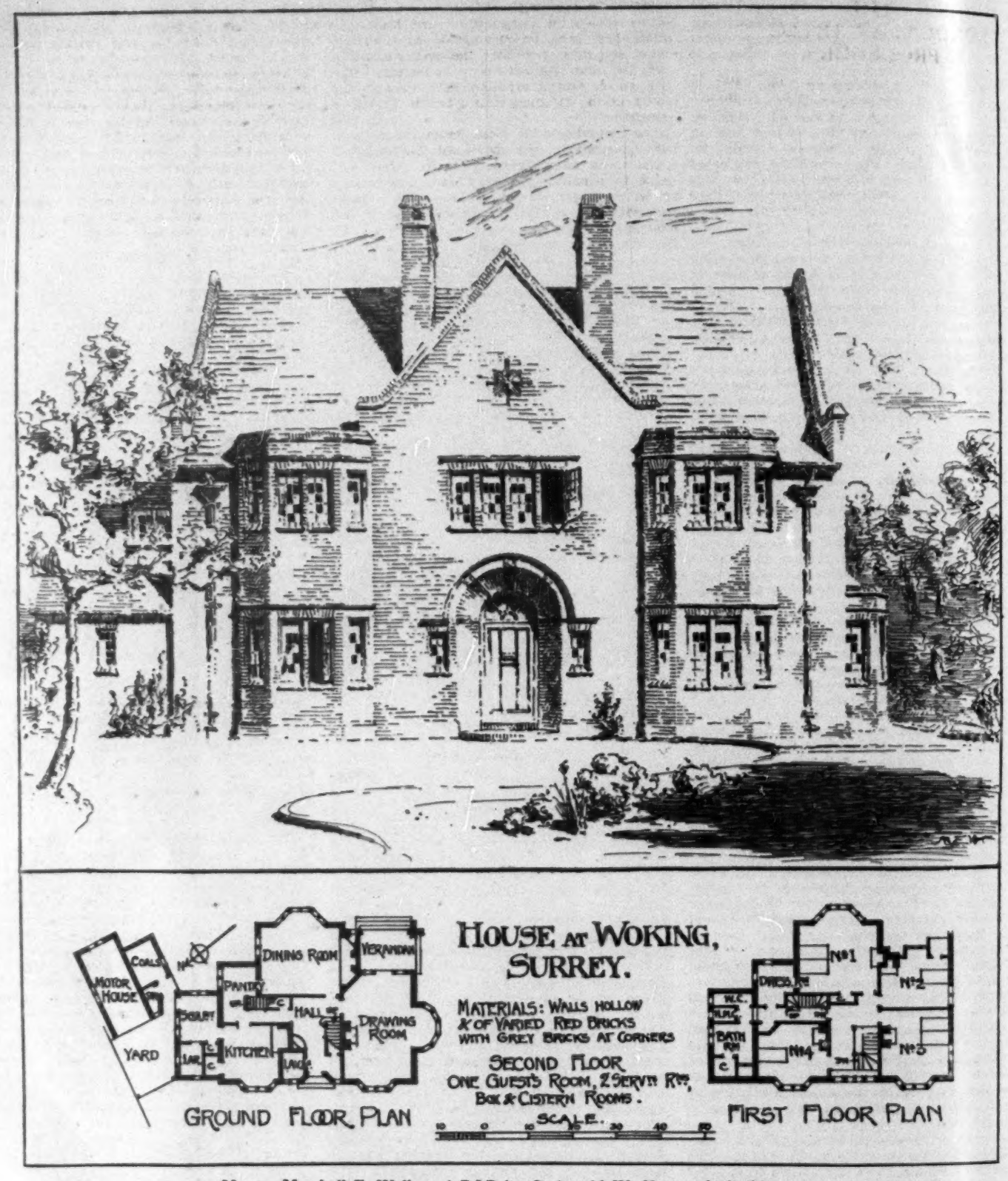
The alienation of material and construction from æsthetic development and use is illustrated by these three national architectures of Egypt, Greece, and Rome; in the first two by an idealised looking backward to ancestral habits, and in the last only by a recognition, almost as unintelligent as it is unrefined, of the need of a popularising element which shall sweeten essential constructive utilitarianism—the confession of this need being both interesting and important to us and our subject.

Gothic.

The development in Gothic architecture of a purely constructive system of design in stone gradually and surely developed its own æsthetic quality. This truth in the last century demanded a recognition denied to it during the generations of the Renaissance art. The attainment of architectural beauty in the mediæval building crafts is a subject fraught with high importance to the modern constructor. The simple ignorance of classic antiquity, and consequently the unaffected confidence in themselves which characterise the Gothic builders, may also generally be said to sum up the relation of the civil engineer and designer of steel structures to-day to æsthetics. So long as these men are blind to the light of antique art, so long, therefore, they are free from error, their ignorance is bliss, and the direct accomplishment of many utilitarian purposes by them has created a Gothic architecture in iron and steel as virile and pregnant with spontaneously æsthetic effects as the early mediæval constructions of stone vaults and flying abutments. If a sober ornamentation were possible, emphasising in metal, as the mediæval masons did in stone, or the carpenters in half-timbered construction, their artistic pride in the craftsmanship of their material, these would be angels; but they are men after all, and can afford us but little leading in our study of the future treatment of reinforced concrete. We have yet to attain that distant mount of vision from which the Forth Bridge, a gasometer, or a reinforced concrete silo will appear as works either of æsthetic value or intention.

But in each of the mediæval crafts as exercised by men of artistic sense trained only in the manipulation of one material we may find abundant instruction in the adaptation of accepted form to materials of varying texture. Long before any architectural grammar was established upon the orders the pointed Gothic arch and incipient tracery of stonework provided the staple for the only decoration added to woodwork, as a multitude of English church doors and screens will show, and similarly buttresses, pinnacles, and spires, severally constructive features developed in stonework, create a forest of decorative fancies in the wooden canopies of choir stalls. Another remarkable adaptation of prototype design by texture is afforded by the ornamental plastered ceilings which attained such richness, artistic vigour, and naturalness in the later Elizabethan time, being developed from the elaborately ribbed pendant stone vaulting of the latest Tudor period; a movement short enough to be covered by one long life. This æsthetic treatment of a plastered surface might suggest that we have arrived at some final illustration of the possible direction for concrete façades, but though yielding suggestions for ornamental freedom, I would point out that, like colour, it is a method of decoration which has æsthetic qualities and charms under architectural conditions, such as fitting the panel or soffit of a room, and offers no substantial guidance for the establishment of a system of design. But this instance affords a valuable example of the influence of material on practical design in the resulting appreciation of the quality of the texture.

It is in complete grasp of the æsthetic quality of any fine work of architecture in its achievement of satisfactory proportions by traditional standards, in its own movements towards a higher progressive originality in the design and employment of detail, in its essential relation to the purposes of the building which it expresses, and its grasp of the higher qualities of monumental and poetic design that the pathway to an æsthetic treatment of concrete lies. The newness of constructive motive, the wide possibilities of extent and achievement,



Messrs. Marshall E. Walker, A.R.I.B.A., & Arnold W. Harwood, Architects.

the freshness of opportunity in textural adaptation are all incentives of great value to the architect, but not one, two, or all the newer qualities will justify him in neglecting the pursuit of a higher analysis of the true developments of architectural beauty or justify him in expecting that the path to glory in concrete architecture will be gained by any shorter route than that of the most earnest application and appropriation of the message of all the great architecture of the past. Till this has been seriously and perhaps slowly undertaken the path of least resistance, of safety and modesty, has been, and still is, to mask the concrete quality by a surface treatment of stone or brickwork in which only those æsthetic problems arise with which experience has qualified us yet to deal. The effervescence and haste to demonstrate the elastic possibilities of the new method and material of which many examples are provided by our Continental *confrères* have interest and are characteristic, but I hope, and am sure, that the great and lasting future of the concrete architecture that is now taking root downwards amongst us will bear fruit of permanent charm, and that being our anticipation it certainly will embody and express a due appreciation of those great principles the fruits of which are offered to us by the historic monuments of architectural art."

HOUSE AT WOKING.

THIS house was designed by Messrs. Marshall E. Walker, A.R.I.B.A., and Arnold Harwood. The walls are built hollow, and of red bricks of varying shades, with the corners of dark grey brick. The roof is of dark tiles of uneven surface, and the external woodwork is stained; the windows are fitted with iron casements.

The front entrance leads through a small lobby into a square hall with panelled dado and angle fireplace in 2-in. grey bricks and basket fire. The drawing-room is 23 ft. 3 in. by 15 ft. 9 in., with a bay in addition overlooking a small stone-paved garden. A verandah, 12 ft. 6 in. by 9 ft., is approached from the drawing-room. The dining-room is 18 ft. by 15 ft., with a large bay and ingle (the latter in 2-in. varied bricks) in addition; the ceiling has dark-stained beams and the woodwork is in oak. The offices are carefully planned and roomy, and a back staircase is provided. On the first floor are four bedrooms and a dressing-room, the largest bedroom being 18 ft. by 15 ft. without the bay window; this bedroom has a specially-designed fireplace of Dutch bricks and tiles.

On the second floor are three bedrooms, the largest 16 ft. by 13 ft., with box and cistern rooms. Most of the bedrooms have good hanging or store cupboard leading from them.

NATIONAL PORTRAIT GALLERY.

Amongst the most recent acquisitions are the bequests of a portrait in oils, by John Jackson, R.A., of Samuel Prout (1783-1852), water-colour painter, and a portrait in oils, by George Clint, A.R.A., of Thomas Goff Lupton (1791-1873), mezzotint engraver.

THE LONDON ARCHITECT'S PROCEDURE.

MANY a young architect, starting practice in London, must have felt that his training has left a gap in the knowledge required of him. He is presumably well equipped as regards his qualifications for designing and superintending the execution of his conceptions, but he has not, as a rule, had an opportunity of familiarising himself with the numerous questions of procedure that arise both before and during the carrying out of his work. It is with a view to supplying this deficiency that we have decided to give the following notes on London procedure with the District Surveyor.

Responsibilities of Building Owners.

Conditions under the various London Building Acts affecting the interests of building owners grow more complicated as time goes on and fresh legislation is enacted. Every London architect realises the necessity of keeping all such conditions clearly in mind, so as to leave no loophole for any suspicion of negligence on his part as a professional adviser. It is true that in the majority of cases the immediate legal responsibility attaches not to the owner, but to the builder. But, apart from the fact that the builder's responsibilities may, in the event of his bankruptcy, for instance, devolve upon the owner, cases are rare in which the expense consequent upon any infringement of the Acts can be fixed upon the builder; and there are many responsibilities attaching directly to an owner after his building is completed and in occupation.

Acquiring a Building Site.

Amongst various questions affecting the choice of a site are those arising under the Act of 1894. Before advising his client to acquire a site the architect will naturally consider what can be put upon it. He will ascertain if it is situate in a street formed after August 7, 1862, as affecting the height of his building, or if in a street formed after January 1, 1895, as affecting the position of the open space required at the rear; and with regard to these questions he will read especially sects. 41, 47, and 49. If there are old buildings existing on the site, he will probably prepare plans of these to be certified by the District Surveyor.

Such plans need not show the internal arrangements of the old buildings. It should be remembered that the District Surveyor's certificate applies only to the extent of the buildings. It does not, for example, apply to the positions of windows; so that, in the matter of ancient lights, however valuable certified plans may be to establish the rights of a servient owner, they are of little use for purposes of a dominant owner.

The right to rebuild to an old frontage line which is nearer than 20 ft. from the centre of the street must be maintained by means of certified plans; and, although this is not compulsory when the frontage is more than 20 ft. from the centre, the District Surveyor's certificate affords valuable evidence.

Notice to District Surveyor.

The notice which the builder is required to serve upon the District Surveyor should first be perused if not drawn up by the architect. Whether in the case of a new building or of alterations to an existing one the intended use of the building must be stated in the notice, otherwise the District Surveyor will not know how the rules of the Acts are applicable; and, although the architect may feel very sure of having complied with all rules, he should fix due responsibility upon the District Surveyor by making him fully cognisant of the facts of the case.

A prudent architect will obtain from his client written instructions as to the intended use of the proposed building. Sometimes the future use is dependent upon uncertain opportunities of letting or selling the property, and in such cases the building must be so designed that it may lawfully be used for any purpose for which it may be required. A building, for instance, that may be let either for purposes of wholesale or retail trade must be constructed as a warehouse, and must also have the open space at rear required for domestic buildings. In such cases the alternative user should be stated in the builder's notice to the District Surveyor.

The importance of close attention to all such questions as the above will be realised when it is remembered that an owner is liable to penalties if he allows his building to be used for purposes other than those for which it is legally adapted; and it is extremely desirable that, in the event of a prosecution, an offending owner should not be able to impute negligence to his architect. In the Act of 1894 rules for habitable rooms under sects. 45 and 70, rules for the separation between the trade and dwelling-house portions of a building under sect. 74 (2), rules as to conversion of buildings under sect. 211, and the various penalties provided under sect. 200 may be studied with advantage.

Every building notice is deemed to be evidence as against the builder of the nature of the proposed work; but it is also evidence that the District Surveyor has been duly apprised of certain facts. In order, therefore, to be prepared to prove service of such a notice the architect will insure its being sent by registered letter, and he will, of course, retain a copy of it.

Deposit of Plans with District Surveyor.

In the case of the alteration or erection of a public building, plans showing the proposed construction are required to be deposited with the District Surveyor. They should accompany the building notice, and the latter should contain some reference to them, such as "erection of a public building to be used as a concert hall, in accordance with plans herewith sent," etc.

Except in the case of metal-framed buildings plans of buildings other than public are not required to accompany a notice, though there are cases where it is convenient to illustrate a notice by means of plans.

With metal-framed—usually steel-framed—buildings the architect should supply the plans and copies of calculations of loads and stresses which are required under the London County Council (General Powers) Act, 1909, to be furnished to the District Surveyor. It will be observed that when notice is served in respect of the proposed work a preliminary fee, equal to one-fifth of the whole fee chargeable, has to be paid. There is no difficulty in calculating the amount payable upon a new building. Upon additions or alterations, however, the amount has to be calculated upon the portion of the building structurally affecter, and this is a matter requiring the architect's attention.

Certificates by District Surveyor.

A builder should not be authorised to cut away any chimney-breast in a party wall unless he can produce the District Surveyor's certificate that this may be done without injury to any building. Such certificate may be of value in the event of complaints by adjoining owners of damage to their property, and the architect should therefore not allow such works to be done upon mere verbal permission of the District Surveyor.

Upon the completion of any public building or of any alterations to one, the architect should obtain the District Surveyor's certificate approving of the construction; and the owner should be warned that, in the absence of such certificate, the building cannot lawfully be used. His attention should be drawn to this rule under sect. 78 of the London Building Act, 1894, and to the penalties for its infraction provided in sect. 200 (11) (*j*). Of course, in the event of any dispute with the District Surveyor a certificate of approval might be obtained from the Tribunal of Appeal.

Cases of Difference with the District Surveyor.

Preliminary discussions with the District Surveyor upon proposed works are, of course, quite unofficial, but they are often of great assistance to an architect, who learns by them that in different districts different views upon some points prevail. It may happen that the architect finds himself at variance with the District Surveyor about some particular work which his client wishes carried out. Of course, it is possible to carry out the work in dispute, leaving the District Surveyor to take whatever proceedings he may think necessary. But a prudent architect will hesitate to risk his client's money by carrying out work which may have to be altered or taken down. The best course is for the architect to serve the District Surveyor with a separate notice, clearly specifying the intended work in question. On receipt of this the District Surveyor, if he objects, will serve upon the architect a notice of objection, which he could not do if the matter in dispute did not appear upon the face of the notice, but was only discoverable from the plans. Within fourteen days after service of the notice of objection the architect may appeal to a magistrate to overrule or confirm the decision of the District Surveyor.

If any requirements of the District Surveyor with respect to steel-framed buildings seem to be unreasonable, an appeal to a magistrate may be made within fourteen days from the Surveyor's notice of such requirements.

When a structure is condemned by the District Surveyor as being dangerous, and the owner is served by the London County Council with a notice requiring him to take down or repair the structure, it may happen that he wishes to dispute the necessity of such requisition. When this is so he may, within seven days from receipt of the notice, write to the Council, requiring that the subject be referred to arbitration. It will rarely happen that an architect can advise his client to take this course, but he should warn him of his position before allowing the seven days to elapse.

Altered Conditions in Buildings: District Surveyor to be Notified.

Few building owners are aware of certain responsibilities attaching to them under the Building Acts in circumstances where few would think of consulting a professional adviser.

Rules as to the uniting of buildings formerly contained in sect. 77 of the London Building Act, 1894, were repealed and re-enacted with some modifications in the London County Council (General Powers) Act, 1908. Sect. 18 (3) provides that when buildings which have been united cease to be in one occupation the owner or owners shall forthwith give notice of this fact to the District Surveyor, and shall cause all openings made in walls for the purpose of uniting the buildings to be stopped up and all timber in the walls not in conformity with the Act to be removed. A penalty of 5*l.* attaches to the infringement of these rules, but it may be further remarked that, should loss of life occur by access of fire through openings unlawfully remaining in a wall, a far heavier responsibility would rest with the building owner.

Fees to District Surveyors.

The fees payable by the builder to the District Surveyor upon completion of the work should, of course, be included in the contract sum, but the owner is legally liable to pay them in the builder's default. Hence he might, in certain circumstances, pay them twice over; to avoid which contingency the architect should, before granting his final certificate, demand production of the District Surveyor's receipt.

KING EDWARD VII. MEMORIAL, DELHI.

The full amount, 33,300*l.*, has been subscribed for the All-India Memorial at Delhi. Sir Thomas Brock, R.A., is appointed as sculptor of the equestrian statue, which will be erected on a site between the Alexandra Gate of the Fort and the Jumma Musjid.

SIR WILLIAM Q. ORCHARDSON MEMORIAL.

The memorial to the late Sir W. Q. Orchardson, R.A., will consist of a reproduction of the bust of the artist, which was sculptured by E. Onslow Ford, R.A. Mr. W. Reynolds-Stephens has been asked to make a design for a tablet to be set in the "Artists' Corner" of the crypt of St. Paul's Cathedral.

GENERAL NEWS.

Professional Announcements.

Mr. Thomas Sladdin, F.R.I.B.A., architect, of Salisbury, Rhodesia, has changed his address since 1910 to P.O. Box 103, Salisbury, Rhodesia.

The partnership between Mr. A. E. Cogswell, architect and surveyor, Prudential-buildings, Portsmouth, and Mr. J. E. Rake having been dissolved, Mr. Cogswell has commenced practice on his own account.

Royal Academy of Arts.

The Keepership rendered vacant by the death of Mr. E. Crofts, R.A., has been filled by the election of Mr. A. C. Gow, R.A.,

Lecture Theatre, Royal Institution.

An extensive scheme of improvement and decoration has been carried out, *ex impensis* Sir James Dewar. The scheme comprises the substitution of mahogany for most of the painted deal work, a new plaster-moulded ceiling, the widening of the staircases, and additional electric lighting. The apartment is famed for its acoustical properties—Faraday said it was "almost perfect as a lecture-room." It was constructed in 1800 from the plans and designs of Thomas Webster, Professor of Geology, University College, who was then employed by Sir Joseph Banks and Count Romford as clerk of the works for adapting the premises in Albemarle-street for purposes of the Royal Institution. The Classic façade was added by L. Vulliamy forty years afterwards.

Waterloo Terminus Improvements.

On December 18 was opened to the public the new approach for vehicular traffic which forms part of the extensive scheme which is still in progress at the Waterloo terminus of the London and South-Western Railway. A broad and spacious roadway from Westminster Bridge-road supplants the old steep approach to the main line from York-road. The new road affords a direct access, with an easy gradient rate, to the platform level in front of the enlarged South Station. The former ascent from York-road is now closed, and all vehicles will leave the terminus by a spur-road to the Lower Marsh exit. The new road will ultimately be extended along the entire length of the station frontage now being made in Waterloo Bridge-road.

Cope and Mitre for the Bishop of Chichester.

A presentation has been made to the Bishop of Chichester, by parishioners in the diocese, of a cope and mitre made in the School of Embroidery, St. Margaret's Convent, East Grinstead. The cope was designed by the Rev. F. Geldart, of Woking; it is of cloth of untarnishable Japanese gold upon a white silk ground; the hood is worked upon white damask having a blue border; the orphrey is worked upon blue and green shot silk in elaborated tracery of green, red, and gold. The mitre is on white silk, edged with a blue border, in which is a running design of green and gold leaves with red insets. The mitre and the clasp of the cope are richly jewelled with sapphires, garnets, topazes, amethysts, emeralds, and moonstones.

More Diaries.

We have received from Messrs. Charles Letts & Co., Southwark Bridge-buildings, S.E., a parcel of some of the many excellent diaries which they publish. The reputation of the firm for the variety and suitability of their productions is well established, and it is evident, judging from the diaries before us, that Messrs. Letts can satisfy any ordinary—and often unusual—requirements in diaries. There are the kind of diaries with which most people are familiar, and in addition we notice the "Schoolboy's Diary," which has met with general acceptance, many of the large public and other schools, we are informed, having their own editions. A similar diary, the "Schoolgirl's," is issued for girls. Then there is the "Boy Scout's Diary," a new issue for 1912, and published under the direction of the Chief Scout; the "Gardener's Diary" is another new diary for 1912. The firm's diaries contains as usual the "Self-Opening Tablet," and also the 1,000*l.* insurance. This year the firm have made it possible for the public to register the insurance coupon with the stationer at the time they buy the diary, a convenience and saving of trouble which the public will no doubt greatly appreciate.

The "City Diary and Almanack, 1912," is a useful work of reference to the City man, for it constitutes an up-to-date and reliable guide to the City in its many ramifications. It contains in particular a complete list of members of the Corporation; the names and addresses of the Clerks of the Guilds; particulars of the City Churches; and full information as to the personnel of the various municipal and parochial organisations of the one square mile. The "Diary" proper gives three days to a page, and is interleaved with blotting paper. The price is 1s. It is published at the *City Press* Offices, 148 and 149, Aldersgate-street, E.C.

The Post Office London Directory.

The Post Office London Directory for 1912 (Kelly's Directories, Ltd., 182-4, High Holborn, W.C.) made its appearance as promptly as usual and as much up to date as any previous issue. The remarkable accuracy of such a stupendous work, and the painstaking care which must be taken in its production, are the salient facts relating to a volume which may fairly be called indispensable, and which, it is difficult to realise, our forefathers, prior to some 113 years ago, were without the help of; and while London remains what it is one cannot think of a time when the Directory will cease to be published. In addition to the well-known divisions of the streets, commercial, trade, and Court, there are others containing legal, Parliamentary, official, postal, clerical and parochial, conveyance and banking information. The Directory, with London county suburbs, can be obtained in one or two volumes, and it includes two excellent maps. The London Directory may be had in the following forms:—Complete Edition, 32s.; Small Edition, 18s., containing the Official, Commercial, Court, Parliamentary, Postal, and Banking; Commercial only, 12s.; Trades, 12s.; Streets, 12s.; Court, 5s.; Banking, 3s.; the London Directory and the County Suburbs Directory may be had, printed on fine paper, bound together in one volume, at the price of 40s., or, printed on the usual paper, in two volumes, price 43s. 6d.

COMPETITION NEWS.

Parliament Buildings, Winnipeg.

H.M. Trade Commissioner for Canada (Mr. R. Grigg) reports that the Provincial Government of Manitoba intend to obtain plans at once for new Government buildings at Winnipeg, estimated to cost over 2,000,000 dollars (about 411,000*l.*). It is stated that the Minister of Public Works will invite sketch designs from prominent architects in the United Kingdom. Of these about five will be selected, and the competitors submitting them will be invited to make out full specifications and plans, from which a final choice will be made. The conditions may be seen at the office of the High Commissioner for Canada, 17, Victoria-street, S.W.

BOOKS.

Church Study. By M. M. PENSTONE. (National Society's Depository, Westminster. 4s.)

THIS book is intended for the school teacher and the amateur rather than for the architect, and must be judged from that point of view. It deals with the building, its furniture, and its officers, and does so very thoroughly.

It is one of the most satisfactory signs of the times that teachers are trying more and more to arouse the interest of their pupils in the world in which they live. Only by teaching the children can we hope to raise the artistic feeling of the nation.

As in most modern teaching, the author intends that the parish church should be visited and, if possible, lessons actually given on the spot.

The book deals with the history of the officers and rites of the church, as well as with the architectural details. With the former we have no concern here, except to say that the author is fair, tolerant, and historically accurate.

The book is remarkably thorough, and profusely illustrated with photos and drawings. The latter are by Mr. John T. Lee, F.R.I.B.A. In the next edition we hope that certain defects will be remedied. Where illustrations of buildings or parts of buildings are given the name of the place should be mentioned. Where types of windows are shown this is not essential, though desirable, but drawings of church towers and a photo of a crypt lose greatly in interest when the name is not given. Illustrations are included of examples of later work, often neglected. Thus the fine view of the XVIIth-century oak gallery and the fine three-decker pulpit at Whitby is especially interesting. The view of Rahere's tomb at St. Bartholomow-the-Great is good, and should interest all Londoners.

The author states that the legs of a Crusader are crossed, and does not make it clear that any great benefactor of the Church might have the same privilege accorded them. There is abundant evidence that many men who never went on a crusade are shown with their legs crossed. Often it will be found that he built or enlarged the church.

The author mentions that in the reign of Edward VI. the Crown confiscated great numbers of chalices and patens, but does not state that Elizabeth ordered that these should be replaced. Though it is probably that the cost of replacing them had to be borne by the parish, yet it shows that the Queen had no sympathy with the plundering propensities of her predecessors. Similarly she dissociated herself from their iconoclasm by ordering the restoration of those monuments which had been damaged.

When modern work is shown it should be stated, and when old the approximate date. In the drawings of lecterns, stained glass, etc., it is not always easy for those who have not made a deep study of the subject to be sure whether the work is copied from old or new work. Of course, those who have studied these subjects much can tell at once, but it is not for them that the book is intended.

In dealing with the church plate some attention should have been given to the XVIIth and XVIIIth century patens, chalices, and flagons which still exist. It is far more likely that the children will see them pre-Reformation ones.

The author points out that church towers were used for defence; the following instance might have been given to help prove the statement. In 1010, after the disastrous rout of the East Angles, the Danes ravaged the countryside. At Balsham, Cambridgeshire, they slaughtered man, woman, and child. One man alone escaped by holding the narrow, winding stairway of the tower. Though these early towers had not the thick walls of the later Norman ones, yet they were strong enough to give some shelter to the inhabitants. The Danes were usually bent on plunder, and so "travelled light." They had no heavy war engines to batter down the walls.

The photo of the tower at Clymping, Sussex, showing one of these fortress towers, is of great interest.

The book is well arranged and accurate. It is based on modern methods of teaching, and should be of the greatest use in spreading a real appreciation of architecture past and present.

The Composition and Strength of Mortars. By W. J. DIBDIN. (London: The Royal Institute of British Architects. Pp. 54, with forty-five diagrams and many sheets of tables. 5s. net.)

THIS is virtually Mr. Dibdin's report on the series of experiments upon lime mortars which he was commissioned to make in 1907 by the Science Standing Committee of the R.I.B.A., and forms a most valuable contribution to architectural empirical science. The greater part of the book comprises tabulated results of the various tests, together with a comprehensive series of diagrams.

The observations made, over 1,700 in number, deal with the following subjects:—

The tensile and compressive strengths of mortars when composed of white chalk, Dorking greystone, and blue lias limes mixed with five different aggregates in varying proportions.

The adhesive properties of stock and Fletton bricks and of various aggregates.

The composition and durability of ancient mortars.

The experiments under the first of these heads were made one month, three months, twelve months, and two years after mixing, and it is interesting to notice that in many cases both tensile and compressive

strengths sensibly depreciated between the last two tests, this depreciation being most marked in the case of poor mortars containing too large a proportion of aggregate, and being probably due to the loss of capillary attraction with the drying-out of the moisture. Another interesting result of the experiments is the refutation of the theory that in mortars of the same ingredients proportions of one to three may be depended upon to give the best results; as a rule, one to two proves strongest as regards both tension and compression, and in one case has nearly three times the crushing strength of a similar mortar in the proportion of one to three. The selection of the best variety of sand for a particular matrix will, in many cases, be greatly facilitated by reference to the results of these tests, and the advantage or otherwise derived from the presence of clay is made clear in respect to the mortars tested.

Exigencies of circumstances forbade the carrying out of the intended tests upon trass, but German Government engineers supplied the necessary information from the extensive experiments which have been made in that country, and a very interesting chapter on the subject is included, which clearly shows that exceedingly powerful mortars result from a proper use of this material.

Tests for adhesion were applied to stock and Fletton bricks and five different aggregates, the lime used being uniform. The Flettons show greatly superior results in each test, their average adhesive strength being double that of the stocks.

In examining ancient mortars, samples were obtained from various localities and of representative periods, and the results of their analysis shows the weathering properties of a given mortar with greater certainty than the most careful laboratory experiments upon recently-made mortars can afford. The examination of these mortars strikingly confirms the deduction already made that the one-to-three rule in mortar making is by no means a reliable one.

One lesson among others this book must impress upon the minds of all who read it—the necessity for very careful reference to previous tests before the ingredients and proportions of a mortar for important works are specified. The wrong aggregate, or the proper aggregate in wrong proportion, may mean a mortar of very inferior quality to one just as easily obtainable.

CORRESPONDENCE.

Decoration of Chelsea Town Hall.

SIR,—The first article in your issue of December 22 has a heading which led me to hope that at last a real "Scheme of Decoration" was under consideration for a public hall.

I find, however, on reading it that the article related solely to the subjects and treatment of pictorial panels, and throughout the article these only are referred to when "a controlling scheme" is spoken of.

It therefore seems worth while to point out that a series of quadrangular panels, even when occupied by masterly paintings, do not by themselves constitute the decoration of an interior. The most passing acquaintance with the decorative works of the great Italian painters would show that in no circumstances could they think of dealing in this way with paintings intended to be decorative. They knew too well that detached pictures, however harmonious with each other, do nothing for the building itself. They knew that if the pictures were to perform a "decorative" function their colours must not stop abruptly at the edge of a panel, but must be also used to express the architectural forms, and extend the harmony beyond the confines of the picture to the building itself—of which it then became a part—possibly the most admirable part.

No artist of note, from Giotto and his school onwards to Michelangelo, or even to Correggio and Pordenone, treated decoration as a question of separate pictures. The pictures were the most interesting and beautiful part of the decoration in which the accessory features played the important part of connecting them with the building which they helped to adorn. This is a fact which the painter of to-day seems to ignore. J. D. CRACE.

The Policy of the R.I.B.A.

SIR,—With reference to my motion for Associates having equal representation on the Council to that of Fellows, I have postponed bringing it forward at the meeting at the Institute on January 8 next, inasmuch as the great pressure of other business at that meeting will prevent its proper discussion and adoption.

I shall, however, bring this motion before the business meeting at the R.I.B.A. on March 4 next, when I still hope that all Associates interested in the subject will attend and support it.

Your correspondent "Swallowite," in his letter published in your last week's issue, is quite wrong when he says that I termed the Licentiates "no class." I have never used such an expression, neither have I ever referred to any "back door" as a means of entrance to the Institute. I have always aimed for far higher ideals than this, nor do I think it advisable to talk about any "line of attack" as he does; but we must all endeavour to strengthen our forces and bind them together, and so obtain our just demands by constitutional and logical methods.

HORACE T. BONNER, A.R.I.B.A.

SIR,—I have read with considerable interest the recent letters of complaint by various Associates, and from the tone of them and from the views expressed by many men in conversation it seems to me there is a deep-rooted feeling of discontent which is not confined to Associates, and it is hoped that a large number of members will attend the business meeting on January 8 and voice their complaints against the suicidal policy of the Council in no uncertain manner. At the same time I wish to offer a protest against the attitude of certain Associates; they seem to wish to join together with common complaint, excluding the Fellows. This dividing of class from class is not only regrettable, but it is quite unnecessary; the object in view is the same for Fellows and Associates—we wish to preserve the status of the Institute and to defend it from attacks from without and within. F.R.I.B.A.

Architectural Assistants and the Office of Works.

SIR,—Mr. Dudley Ward, as representing the First Commissioner, in his answer on the 15th inst. to Mr. Noel Buxton in the House of Commons, when asked to "state the classes and the total number of architects employed in his Department," and "what number of them are Associates or Licentiates of the Royal Institute of British Architects," makes no mention of the class numbering forty termed "Architectural Assistants," of whom nineteen are Associates or Licentiates.

This omission is all the more curious seeing that Mr. Dudley Ward had his attention drawn to this class very distinctly by Mr. Philip Snowden in the House of Commons as recently as the 24th ult., and he then stated he would consider establishment for "a number of professional men engaged in the Office of Works termed 'Architectural Assistants,' who possess their Board's certificate of technical efficiency, some of them being members of the Royal Institute of British Architects, Surveyors' Institute, and allied societies." And, more recently still (on the 7th inst.), he replied to Mr. Philip Snowden in the House that "the desires of each member of the 'Architectural Assistants'" class should be ascertained, so that all of the class shall have the opportunity of being placed upon the established list."

Of course, the reply under review was furnished by those in office under the First Commissioner, and upon whom he relies for all his facts, and the list thus supplied to him being incomplete, was incorrect, and, therefore, may we not assume that the cost of the staff in salaries, therein stated to be 3·34 per cent., to be also equally incomplete, and, in fact, has been so stated to be, to the extent of another 3 per cent., by the President of the Royal Institute of British Architects?

THE WHOLE TRUTH.

The Statue of Achilles.

SIR,—As Mr. E. Swinfen-Harris rightly remembers, the Achilles statue was standing before the Crimean War. The mistake arose from a confusion of military heroes, the statue having been erected to the Duke of Wellington in the year 1822. From a public advertisement soliciting subscriptions from the ladies of England towards erecting a monument to the Duke of Wellington one learns it was intended that this would take the form of "a facsimile of a statue by Phidias, representing Alexander the Great taming Bucephalus." This was a trifle unfortunate, as Phidias must have been dead quite a hundred years before Alexander the Great saw the light. The Committee got out of the difficulty by putting the Duke's head on the statue and introducing him to the public as Achilles. The author is unknown, but Westmacott stuck on the sword and shield. It was cast from cannon taken from the French, but when brought to the Park on June 18, 1822 (the anniversary of Waterloo), it could not pass the gates, and about a month elapsed before it was properly placed. It was uncovered on July 14, and met with the usual outburst from the public; a certain celebrity of the day going so far as to inform the shocked readers of the *Morning Herald* that "if his mother, who was a Newcastle woman, had caught any of her children looking at such an object she would have soundly whipped them." What the ladies who subscribed for the statue thought may be better imagined than described, for it is said that from the day it was uncovered the Wellington Drive was abandoned.

HERBERT SHEPHERD, A.R.I.B.A.

Suburban Gardens.

SIR,—As an artist who for some years has studied with much interest the question of the beautifying of the innumerable small and ugly suburban gardens the monotonous type of which exists in thousands I have been greatly encouraged by the many lettters of appreciation I have received of my book, "My Old World Garden and how I Made it in a London Suburb." Since you were kind enough to notice it favourably on its publication last year many of the public have adopted my plan of reform in their small gardens, and I have just received a typical letter from a lady enclosing a photograph of her small town garden which she has reformed (last autumn) on these lines. One point strikes me—that were the garden-owner to consult an expert at the outset the result would undoubtedly be better still.

G. HILLYARD SWINSTEAD, R.I.

Garden in Bedford.

EDITORIAL SUMMARY.

The leading article, "The Architect's Clerk," is suggested by the papers and discussion at the Royal Institute of British Architects on the 18th inst. on the "Newer Responsibilities of Architects."

A second article, entitled "The Woman in the Case," deals with the possibilities of architecture as a profession for women (p. 766).

In "Notes" columns (p. 767) will be found observations on: "The Guildhall Improvement Scheme"; "The Wellington Monument in St. Paul's Cathedral"; "London University"; "The Care of Art Treasures"; "Our Next Issue."

A report of a meeting of the Nottingham Architectural Society appears on p. 768. A paper was read by Mr. W. H. Taylor entitled "Some Notes on the Law Relating to Building Schemes."

At a meeting of the Concrete Institute in June last Professor Beresford Pite read a paper on "The Æsthetic Treatment of Concrete." The paper is printed in full on pp. 769-772.

An article entitled "London Architects' Procedure" appears on p. 773.

Book notices (p. 774) are: "Church Study"; "The Composition and Strength of Mortars."

In Correspondence columns (p. 775) will be found letters on: "The Decoration of Chelsea Town Hall"; "Architectural Assistants and the Office of Works"; "The Policy of the R.I.B.A."; "The Statue of Achilles"; "Suburban Gardens."

The monthly illustrated review of Engineering (p. 777) contains: "The Sitter Viaduct, Switzerland"; "L.C.C. Regulations as to Reinforced Concrete Buildings"; "Foundation Loads"; "Homogeneity of Beton"; "Reinforced Concrete Bridge at Cork"; and "Applying Cement Mortar by Compressed Air."

The Building Trade Section (p. 784) contains: "Factory and Commercial Property Sales, 1911"; "The Employment of a Specialist"; "The Budget and the Building Trade"; "Edinburgh Master Builders' Association"; "Projected New Buildings in the Provinces."

In "Legal Column" (p. 787) will be found some remarks on "Water Charges."

MEETINGS.

FRIDAY, DECEMBER 29.

Junior Institution of Engineers.—Visit to the factory of Messrs. Otto Monsted, Ltd., margarine manufacturers, at Southall. 3 p.m.

WEDNESDAY, JANUARY 3.

Institute of Builders (Koh-i-noor House, W.C.).—Mr. A. W. Gattie on "How to Cheapen Transport," with reference to the Building Trade. 4 p.m.

THURSDAY, JANUARY 5.

Junior Institution of Engineers.—Presidential Address by Commendatore G. Marconi, on "Engineering Considerations in Wireless Telegraphy," has been postponed.

ILLUSTRATIONS.

Royal Academy Schools.

LAST week we illustrated the designs of Mr. Binning and Mr. Bucknell, submitted in the Gold Medal and Travelling Studentship Competition, and this week we reproduce the drawings of Mr. Adrian Berrington and Mr. John C. Rogers. The article in our issue of December 15 should be read in connexion with the work of these and other Royal Academy students.

Since Mr. Berrington's design for an "Open-Air Bath," drawn when he was a student of the Liverpool School of Architecture, was reproduced in the *Builder* (1906) his work has become familiar to our readers. His design for a "Loggia in a Public Garden" obtained for him the Travelling Studentship (60*l.*) of the Royal Academy last year, and his sketches made during his tour in Scotland were much admired when shown recently in the Exhibition of Students' drawings. His unsuccessful design for the Gold Medal, 1909—"A Nobleman's Mansion"—was illustrated in the *Builder*, April 14, 1911.

Last year Mr. John C. Rogers obtained the Silver Medal for his Measured Drawings, "The College at Westminster School"; these were illustrated in the *Builder*, May 19, 1911.

FIFTY YEARS AGO.

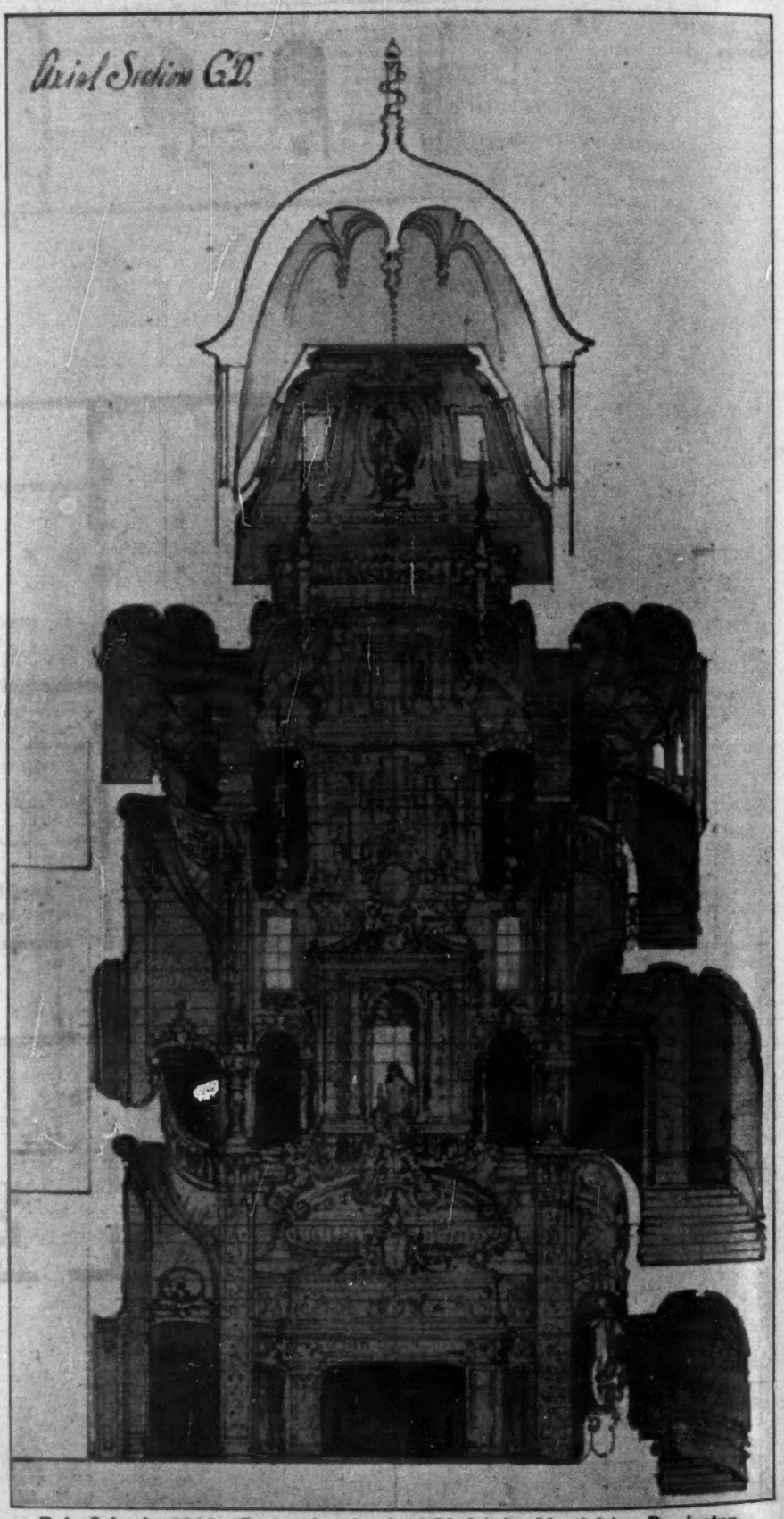
From the *Builder* of December 28, 1861.

Metropolitan Improvements Hopeless.

LONG though it be since complaints have been made of the numerous straits and incongruities of the London thoroughfares, but little has been done to remedy the palpable evils which obstruct traffic. Grand things are prefigured, such as the stupendous sewage scheme and the embankment of the Thames; but great improvements might be made by only attending to small matters; and important easements might be afforded to the incessantly rolling multitude by only opening small straits and removing obstacles from the causeways of ancient intercommunication.

If alterations were turned to improvements in the old thoroughfares—to abating nuisances where they exist, to widening the choked gorges of such routes as Holborn, Chancery-lane, the Strand, clearing an opening northward, from Clement's Danes, by Russell-square, to Hampstead-road; striking out a leading line from London-bridge, on the south side, to Westminster (giving vent to all the intermediate bridges); then Londoners would acknowledge that some *real regard* was shown for improvements, and that the expense of the Board of Works was not wholly thrown away.

The localities susceptible of improvement within a City range of 50 square miles are very numerous; the means for amendment are without stint: the requirements should not then be thought beneath the care of a minister who could easily find a modern Æmilius to illustrate the office of Ædile.



R.A. Schools, 1911: Design for the Gold Medal, by Mr. Adrian Berrington.

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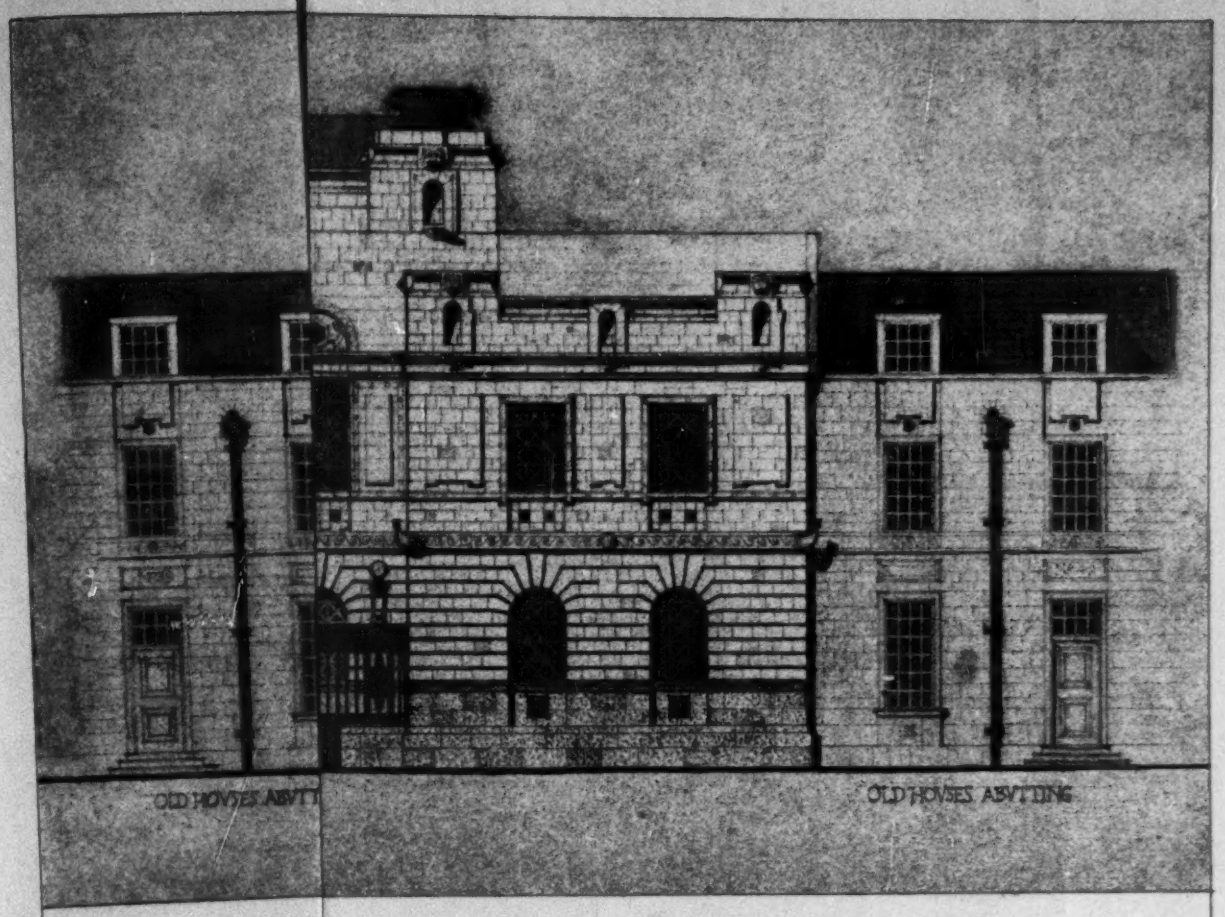

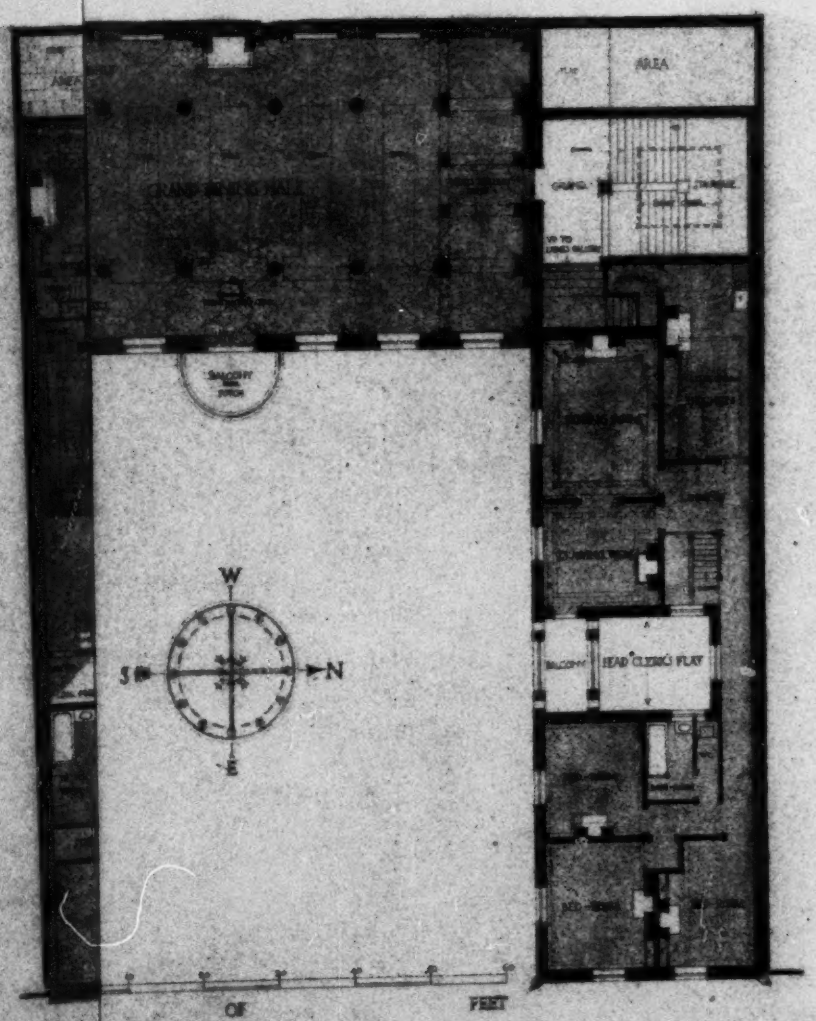

FIRST FLOOR PLAN

"INK-PHOTO" SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

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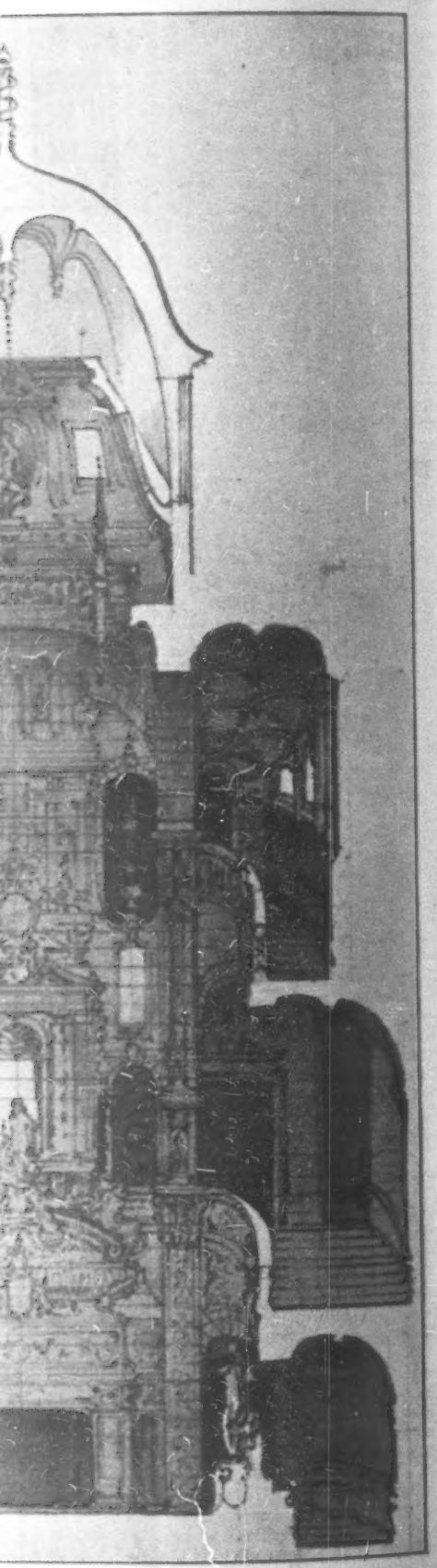
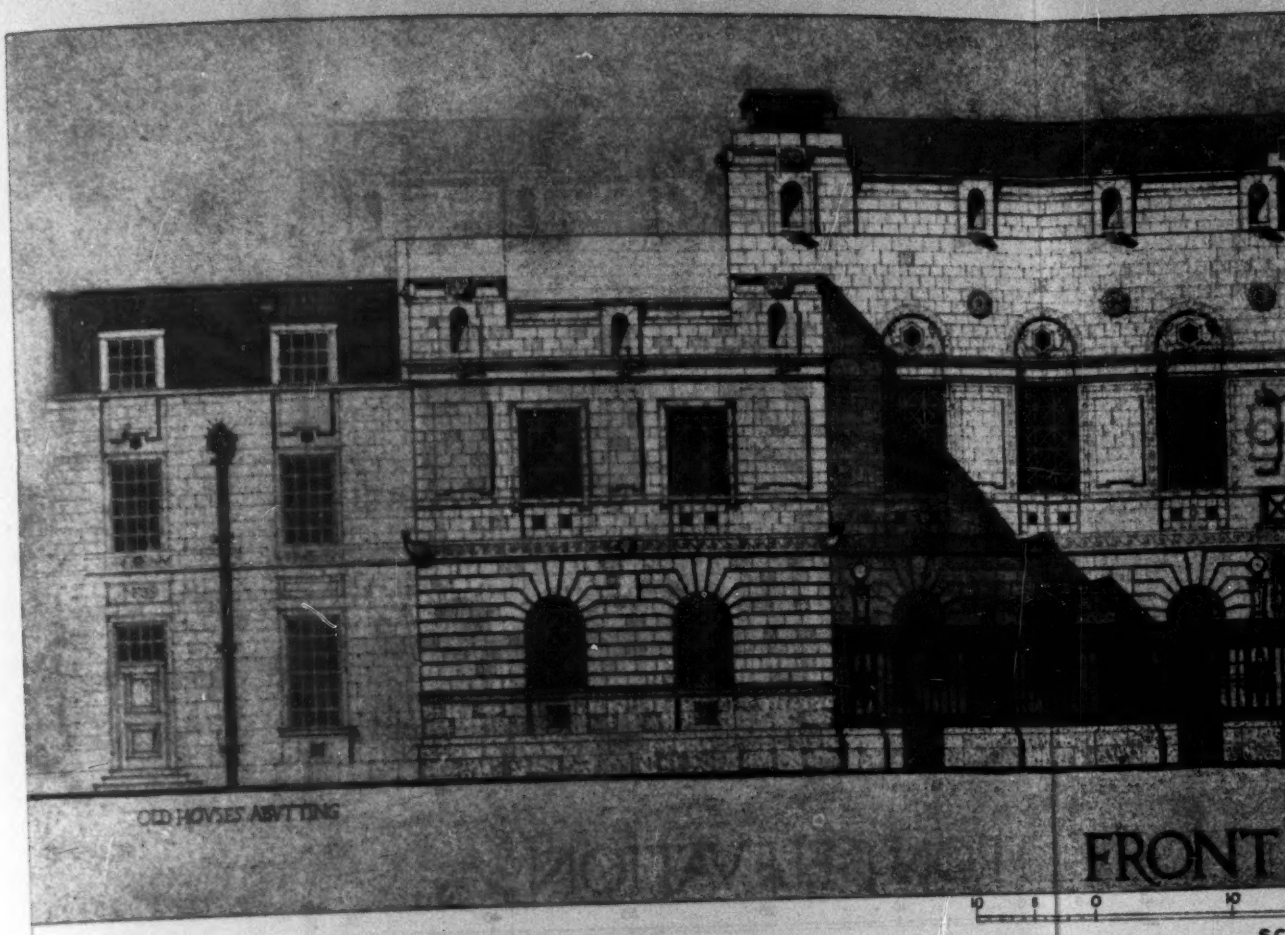
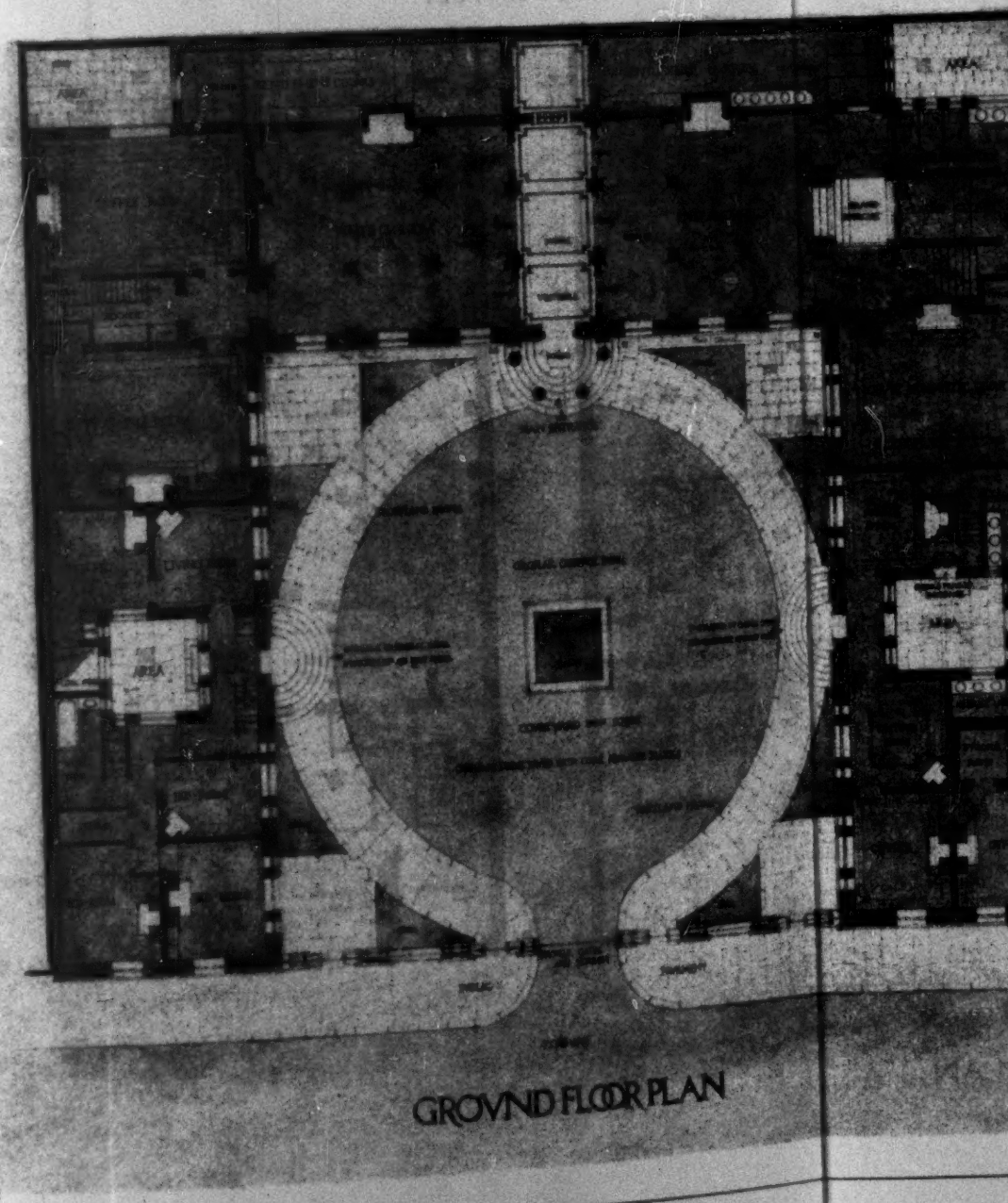
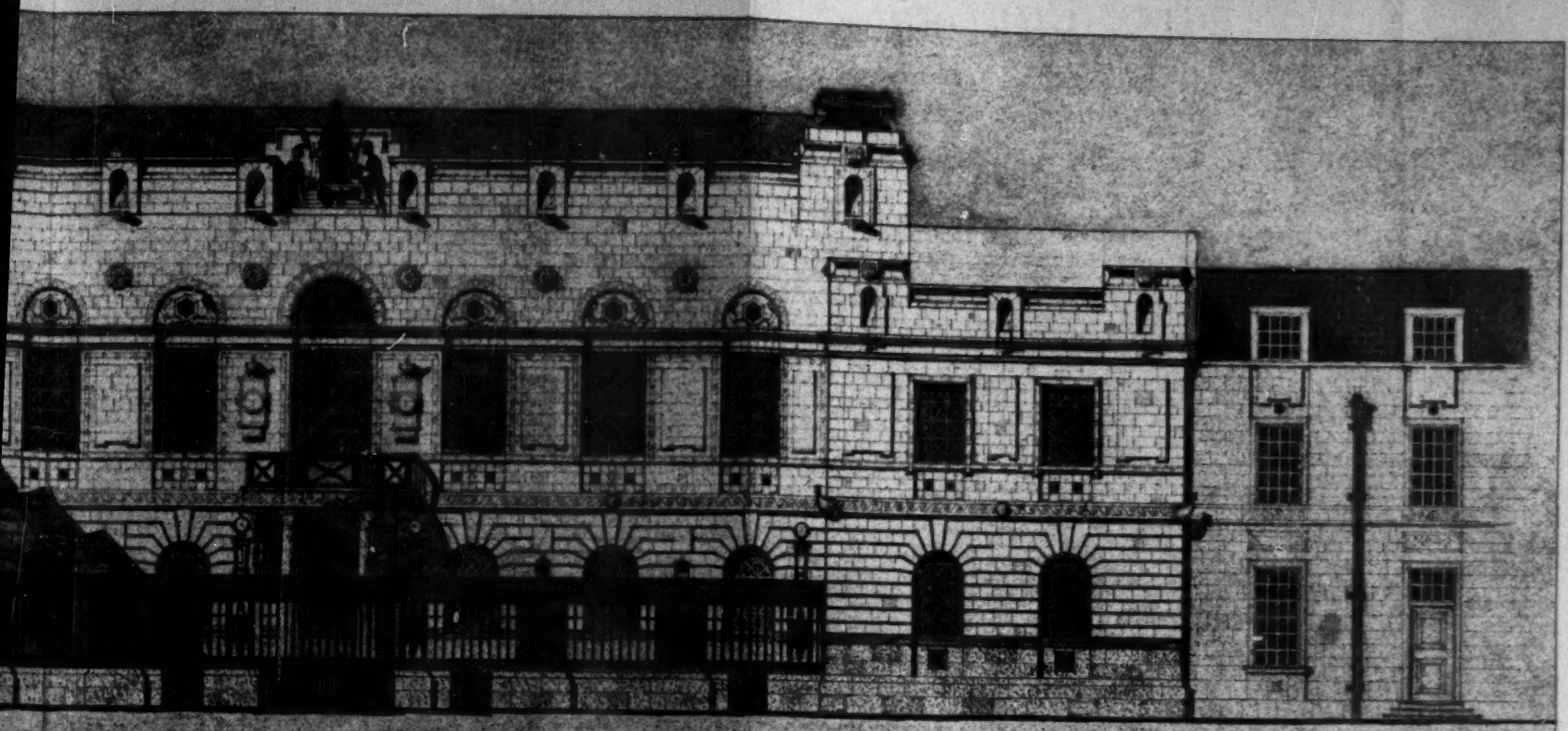


Gold Medal, by Mr. Adrian Berrington.





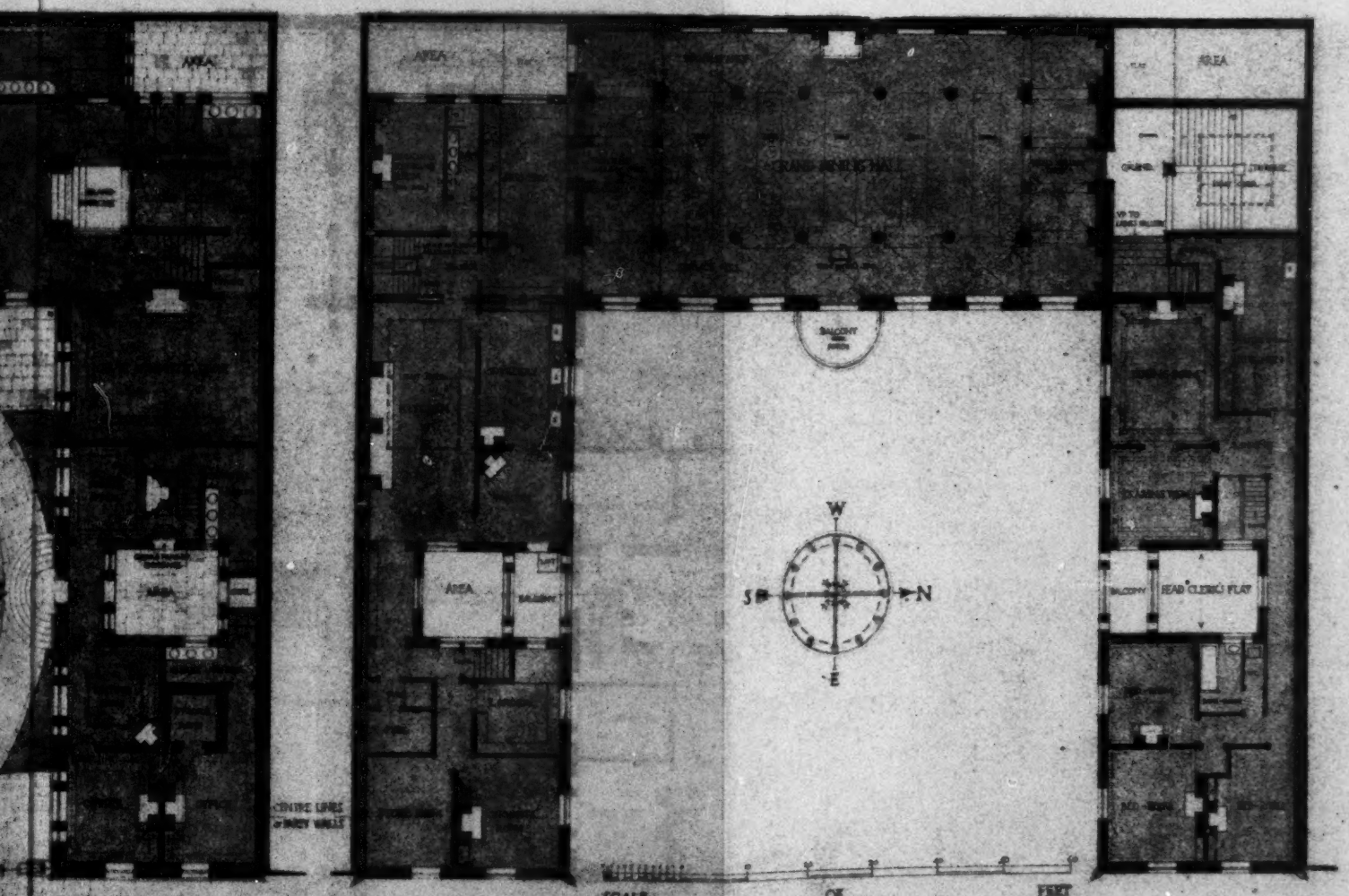
R. A. SCHOOLS, 1911: DESIGN



OLD HOUSES ABUTTING

FRONT ELEVATION.

SCALE OF FEET.



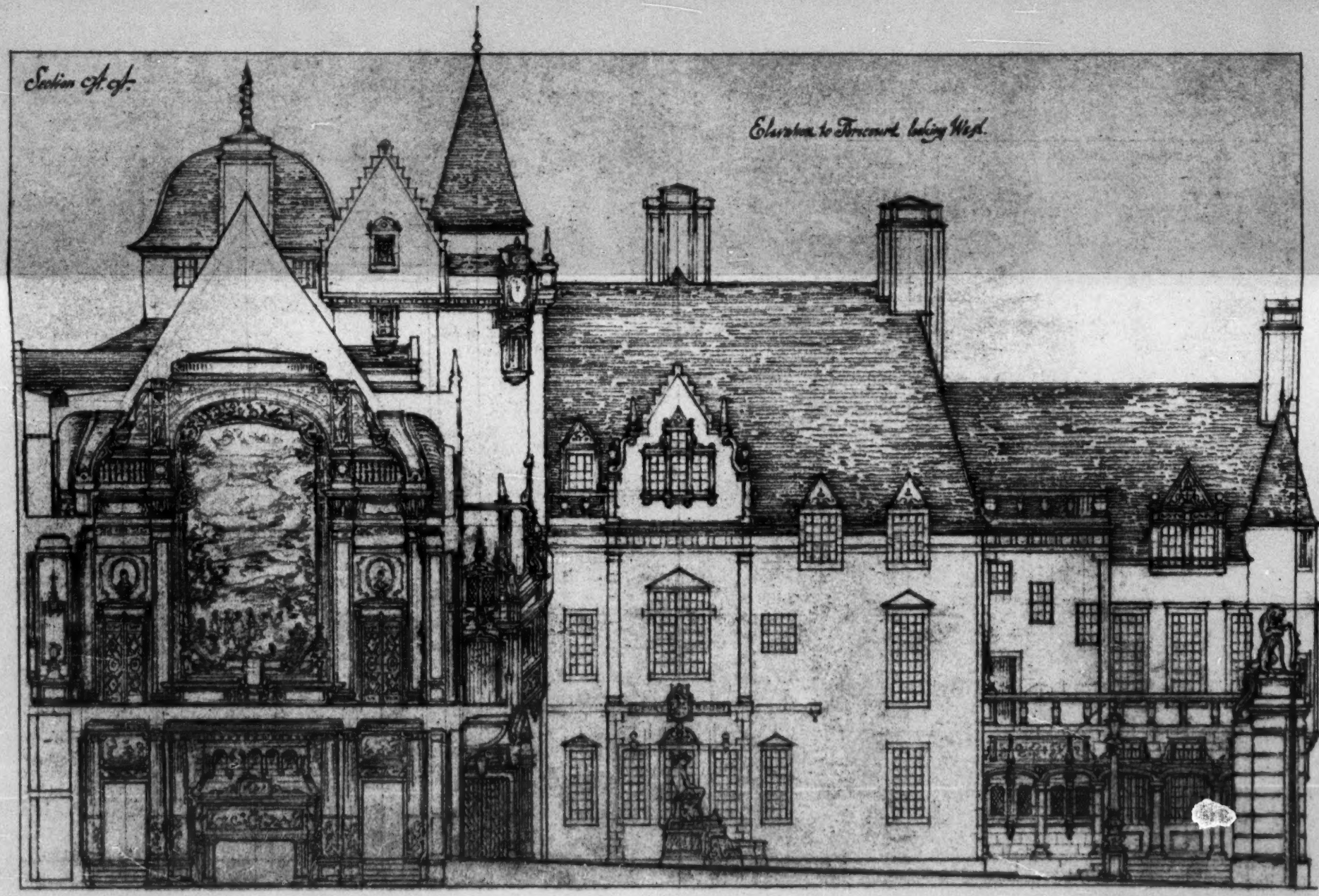
SCALE OF FEET.

FIRST FLOOR PLAN

INK-PHOTO SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

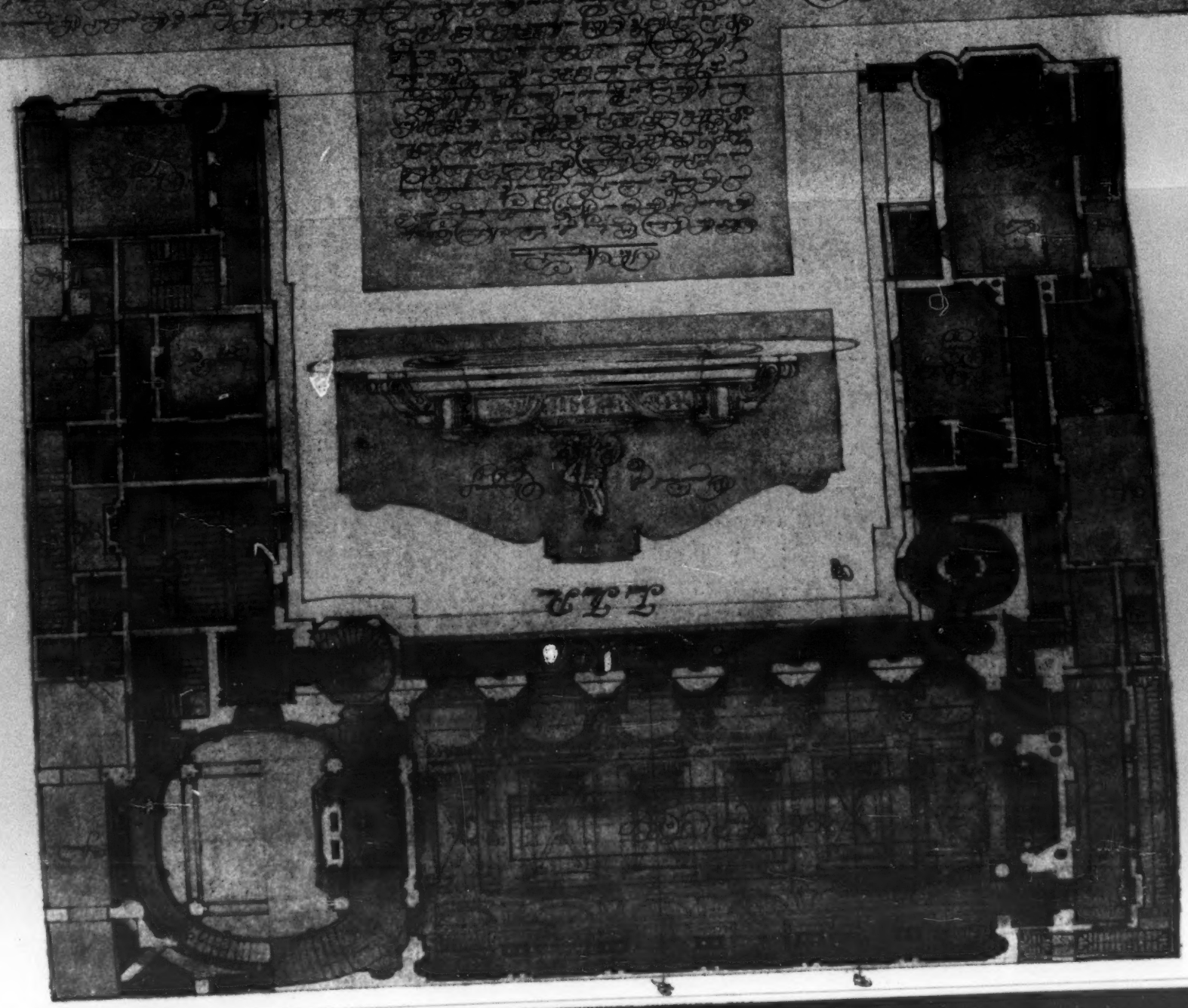
OOLS, 1911: DESIGN FOR THE GOLD MEDAL.—By Mr. John C. Rogers.

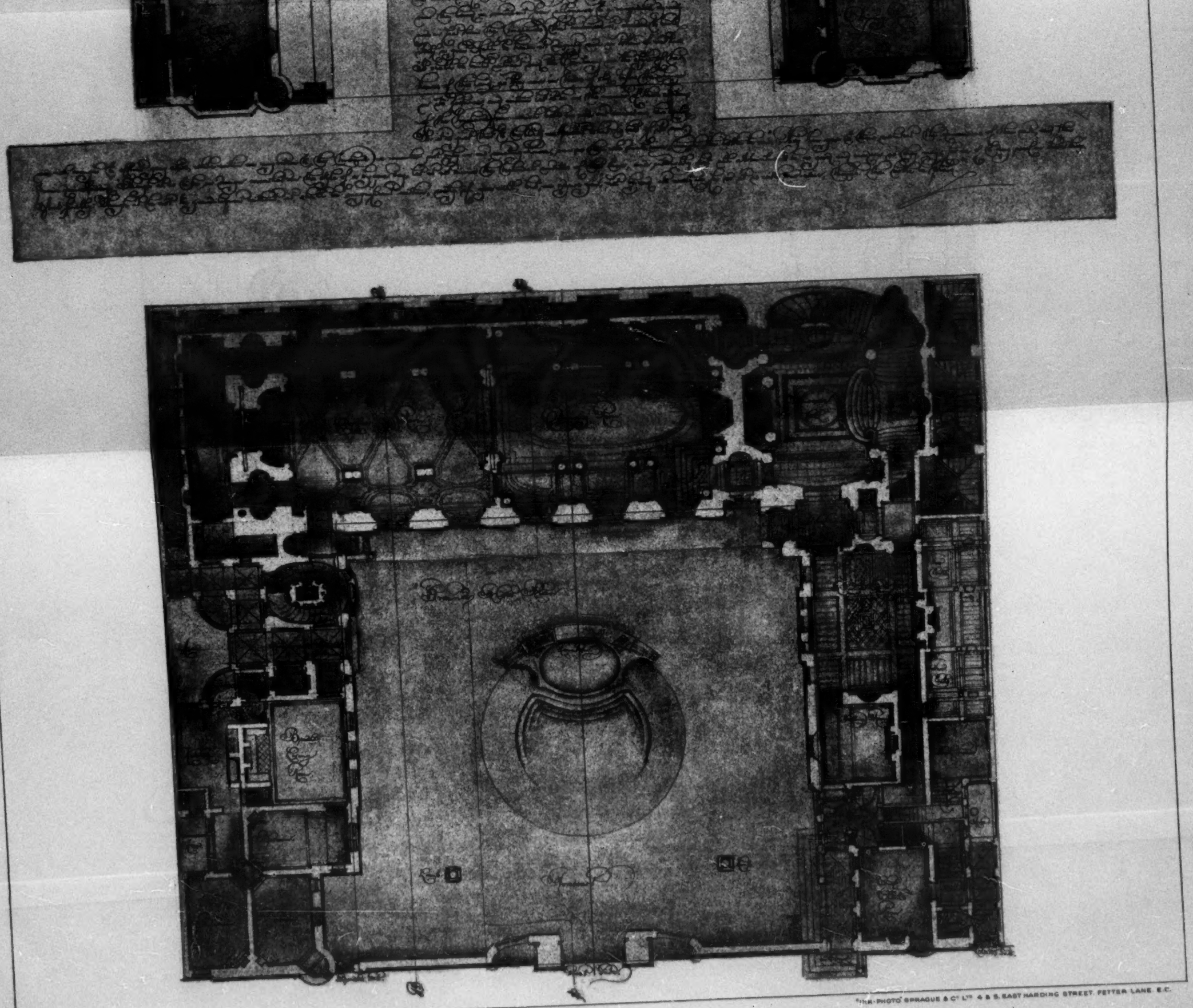
Elevation to the Street



INK-PHOTO. SPRAGUE & Co LTD 4 & 5, EASTHARDING STREET, FETTER LANE E.C.

R. A. SCHOOLS, 1911: DESIGN FOR THE GOLD MEDAL.—By Mr. Adrian Berrington.





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R. A. SCHOOLS, 1911: DESIGN FOR THE GOLD MEDAL.—By Mr. Adrian Berrington.

MONTHLY REVIEW · *of* · ENGINEERING.

Sitter Viaduct: Erection of Girder Span.

THE SITTER VIADUCT, SWITZERLAND.—II.

[*Continued from page* 578.]

Timber Construction Tower.

As the girder span, described in our previous article, had to be erected at the height of 98 metres above the bed of the river during the construction of the masonry piers, continuous staging could not be used economically; neither was it economically practicable to erect staging for half the span and to complete the work by building out on the cantilever principle. After having considered various alternatives, Messrs. Theodore Bell & Co. decided to build the large construction tower of which drawings are given on page 778, and from this to erect the steelwork in the form of a double-armed cantilever, as represented above.

The tower is a noteworthy example of timber work, 97 metres high, and, including contractors' plant and appliances, weighed 2,500 tons. As the wind pressure, taken at 150 kilograms per square metre, involved a maximum force of 400 tons it was necessary to inquire very carefully into the stability of the structure.

Timber was adopted instead of steel, for the reason that the material could afterwards be utilised more readily in other works. But the designers had to encounter the difficulty that no precise records were available, showing the distribution of forces on a framed structure of such unprecedented dimensions, and, besides, it was very important to keep to the minimum all movements of the working platform, in order that the erection of the steelwork could be conducted with the required degree of precision.

With the laudable desire of leaving nothing to chance, the firm constructed large models of the principal elements and tested them under hydraulic pressure. This investigation furnished interesting data on the deformation and the limits of resistance of the framework, and from the results so gained were deduced the fundamental data of the calculations for the tower.

Briefly described, the work comprises a tower 74·80 metres high, surmounted by an enlarged head, carrying at the height of 98 metres a working platform equipped with a travelling crane and other machinery. The eight main uprights of the tower were securely anchored into masonry foundations, four of which were in the bed of the river. As an additional precaution, the summit of the tower was guyed by eight 30-millimetre cables anchored to the foundation of the viaduct piers.

The construction of the tower required 3,500 cubic metres of timber, 42 tons of bolts, and 7·6 tons of steel plate in the form of washers.

At the base of the tower was a platform, 30 by 23 metres, for assembling steelwork and where a lift was installed for raising material to the upper working platform and a second lift for men employed. One lift with the vertical height of 98 metres was capable of hoisting a load of 12 tons, and the other, with the vertical height of 78 metres, was capable of conveying ten to twelve men. The upper and lower platforms were in telephonic communication.

In order to guard against fire risks the tower was provided throughout with water pipes and numerous hydrants, and was watched during the night.

Erection of Steelwork.

The first operation was the assemblage of the middle portion of the span, the lower members of which rested on cast-iron sand boxes. Upon the upper booms a travelling crane, weighing 80 tons was erected. This crane, with the horizontal overhang of 36 metres, was moved forward as the work of building out the cantilever arms advanced, its weight being counterbalanced by steel bars stacked at the opposite end of the work.

Thanks to the sand boxes employed by the contractors, the ends of the girder span could readily be adjusted as necessary, and they were particularly useful when the span had been completed and only required to be lowered upon the supports, one of which was 2 metres higher than the other. The four sand boxes with the effective height of 1 metre gave full latitude for this regulation. The only precautions requisite were to keep the sand thoroughly dry and the two parts of each box well lubricated, so as to facilitate their movement when sand was allowed to flow out for lowering the span.

The ends of the girders rest upon four enormous granite seats, each weighing 13,500 kilograms.

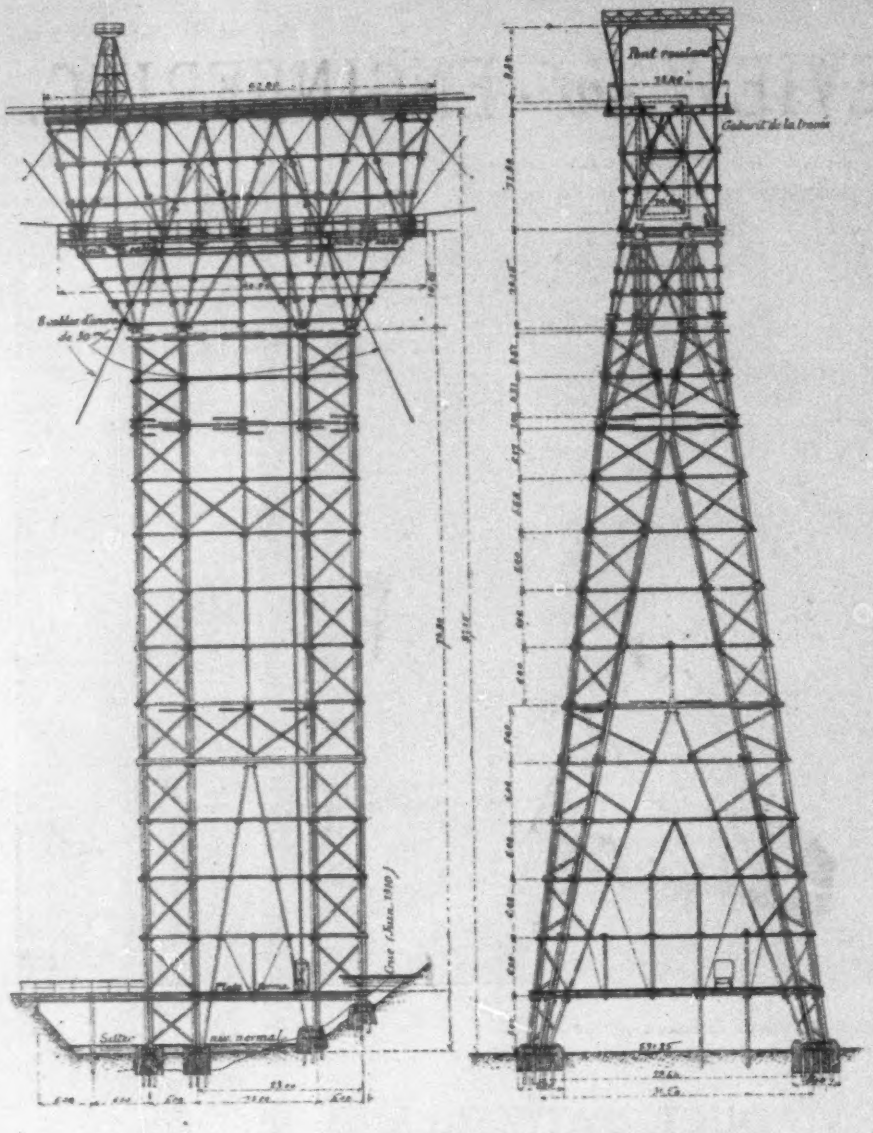
The total cost of the viaduct, which has been in service for several months, was 1,513,000 francs, representing 78 francs per square metre of surface.

We are indebted to Messrs. Theodore Bell & Co. for the photograph reproduced above.

L.C.C. REGULATIONS FOR REINFORCED CONCRETE BUILDINGS.

In pursuance of the powers conferred by Parliament in 1909, the London County Council are about to make regulations with respect to the construction of buildings wholly or partly of reinforced concrete, and with respect to the use and composition of reinforced concrete in such construction.

At present the position of the matter is that the Building Acts Committee have prepared a draft code, embodying some of the alterations proposed by the Surveyors' Institution, the Institution of Civil Engineers, the Royal Institute of British Architects, and the Concrete Institute. This amended draft was brought before the Council on November 13 last, but was not then passed.



Sitter Viaduct: Timber Construction Tower for Steel Girder Span.

(From *Génie Civil.*)

After having come before the Council again for approval, the proposed regulations will have to be sanctioned by the Local Government Board and the four institutions mentioned above will have a second opportunity of putting forward any amendments they may consider to be necessary.

Unlike the purely optional recommendations of the Royal Institute of British Architects' Committee, the London County Council regulations will be rigidly enforced by law, for by the London County Council (General Powers) Act of 1909 they will become equivalent to an Act of Parliament.

Hence it is of the utmost importance to architects, building contractors, and the public that the nature and effect of the regulations should be very carefully examined and considered before the new code is brought before the Local Government Board for sanction.

Experience shows, especially at the present time, that it is not always an easy thing to make laws; but it shows that the amendment of existing laws is very much more difficult.

Two examples of the second case will serve our purpose. One is that of the unfortunate and short-sighted law which forbade any mechanically-propelled vehicle to be driven on the public highway at more than walking pace and without the attendance of a man in front waving a red flag to warn the public of possible disaster. For a generation this absurd law was in force, much to the delight of foreign nations and the injury of British industry.

The other example is that of the Building Regulations made at the instance of the Metropolitan Board of Works and perpetuated almost without alteration by the London Building Act of 1894, an enactment which has continued its baleful influence by prohibiting improved methods of building, until the present year, and still bars the way of reinforced concrete construction.

All credit is due to the London County Council for their various efforts to remove obsolete and vexatious restrictions, and for their obvious desire to place steel-frame and reinforced concrete building construction upon a sound and reasonable basis.

So far as the latter method is concerned, it is particularly desirable that the draft regulations now awaiting approval should be of scope sufficiently wide to permit the introduction of improved materials and improved methods without involving the tedious delays invariably accompanying any effort to amend existing laws and regulations.

As we show later, there are some clauses in the new regulations proposed by the County Council which indicate an undesirable lack of foresight and elasticity, and we hope that the instances mentioned will receive attention not only by the technical advisers of the Council, but also by the professional societies cited in the Act.

In the subjoined notes we follow the order of the draft regulations as printed for consideration by the County Council.

Part I.—General.

The definition of reinforced concrete in paragraph (1) states that the reinforcing metal shall

"(*a*) Be sufficient to take up all the direct tensile stresses;

(*b*) Assist in the resistance to shear;

(*c*) Assist in the resistance to compression where necessary."

Line (*a*) should be amended by omission of the word "direct," for *direct tensile stress* is rarely contemplated in reinforced concrete design, and the Council should provide for *all tensile stresses*, and not merely one very unusual variety, to be taken up by the reinforcement. Our amendment would make the definition cover tensile stresses due to direct pull, to flexure, and to the combination of flexure and shear.

Line (*b*) suggests that the Council have fallen into the common error of confusing shear with tension on diagonal planes in beams. Whether they have done so or not is not perfectly clear.

Paragraph (3) states that "all floors and staircases (together with their enclosing walls) shall be constructed throughout of fire-resisting materials, and be carried upon supports of fire-resisting materials." This paragraph appears to have been transferred from the regulations for steel-frame buildings, where also it is stipulated that the construction shall be "throughout of fire-resisting materials," the phraseology clearly forbidding the use of structural steel or reinforcing steel in floors, staircases, staircase walls, and their supports. This cannot be intended, and the paragraph ought to be worded properly so as to convey the true meaning of the Council. Why not simply say that the structural details in question shall be of fire-resisting construction?

Part II.—Data.

The paragraphs applying to floor and roof loads are similar to those in the regulations for steel-frame buildings and require no comment, and the same remark applies to the paragraphs concerning wind pressure, but in paragraphs (19) to (46) we have various rules affecting computations for reinforced concrete structures.

Weights.—An opportune reminder is given to the effect that the dead weight of material must not be forgotten, the weight of reinforced concrete being stated at the reasonable average of 150 lb. per square foot.

Ratio of Span to Depth of a Beam.—Three paragraphs under this head amount to the somewhat ineffective stipulation that the ratio shall not exceed 24, but may exceed that value if the calculated deflection is less than $\frac{1}{300}$ of the span. Since the limitation of the ratio cannot in itself assume stiffness, it would be better to omit the point and to adopt instead a minimum proportionate deflection in terms of the span.

Bending Moments.—A clearly-expressed statement of formulæ for the bending moments of beams under different load and other conditions will be found very convenient to all making use of the regulations. Another excellent feature is constituted by the simple and reasonable rules proposed for computing the bending moments in slabs differently reinforced and supported or fixed. The treatment of this section is far more practical and helpful in every way than the corresponding recommendations of the Royal Institute of British Architects' Report.

As an instance we may point out that while the latter says the bending moments in slabs are not to be taken at less than Wl/12, unless determined by exact calculation, the London County Council regulations allow values up to Wl/24, according to circumstances.

We do not overlook the fact that the rules given are necessarily quite empirical, for the simple reason that there is no reliable theory for the calculation of bending moments in reinforced concrete slabs, supported or fixed along all the edges.

Working Stresses.—This is an important section, the values applying to all structural members, with the exceptions provided for under the subsequent head of pillars. The working stresses allowed are as given in the tables which appear in full on the next page.

There are several points in these demanding comment. First, by "Direct compressive stress" we presume the reader is to understand what the word "direct" actually means, namely, the stress due to a direct push, and not what the same word is wrongly used to denote in Part I., line (*a*), in connexion with tensile stress.

Second, the expression "Extreme fibre stress" is loose, and should read *extreme fibre stress in compression.*

Third, the shearing stress of 60 lb. per square inch is absurdly low for simple shear, since it is now well known that concrete is quite capable of withstanding shearing stress intensity up to about half the permissible working stress in compression. But shearing stress is usually taken as the measure of indeterminable tensile stress on diagonal planes, and the fact is, as we have previously stated, that it is not safe to allow more than 25-30 lb. per square inch,

Stresses on Concrete.	Proportion by Volume.					
	Cement. 1	Sand. 2	Coarse Material. 4	Cement. 1	Sand. 1½	Coarse Material. 3
	Stress in pounds per square inch.			Stress in pounds per square inch.		
Direct compressive stress	600			700		
Extreme fibre stress	600			700		
Frictional stress between concrete and steel	100			100		
Shearing stress on plane section	60			60		
Tensile stress	Nil			Nil		

Stresses on Mild Steel Complying with the British Standard Specification.	Pounds per square inch.
Direct compressive stress = mc, where m = modular ratio and c = safe working compressive stress (in pounds per square inch) on concrete surrounding the steel	mc
Direct tensile stress on mild steel in longitudinal members	17,000
Tensile stress in web-reinforcement	12,000
Shearing stress on mild steel	12,000

expressed in terms of shearing stress, as the working stress for diagonal tension. A still safer and more logical provision is to allow nothing for the tensile resistance of the concrete by demanding that the calculated shearing stress (representing tension on diagonal planes) shall be taken up by suitable web reinforcement. If the Council are wise they will make clear that the next line, "Tensile stress . . . nil," is to cover both longitudinal and diagonal tension by inserting the requisite words.

Fourth, it is not made clear whether the stress for mild steel denoted by the expression, "Direct compressive stress = mc," is intended to apply solely to pillars and struts or to pillars and struts and beams, the uncertainty being due to the previously-mentioned misunderstanding on the part of the Council as to the proper use of the word "direct."

So far as pillars and struts are concerned, the values given by mc would be in accord with the elastic theory as accepted by many authorities in all parts of the world. But the values will not apply to the compressive stress c_s on steel in beams until they have been qualified by a factor representing the relative levels of the neutral axis and the axis of the steel employed as compressive reinforcement; or unless the value for c has previously been qualified in a similar manner. For example, assuming the axis of the steel to be coincident with the compressed surface of the concrete, we should have: $c_s = mc \times 1$; while, assuming the axis of the steel to be coincident with the neutral axis, we should have: $c_s = mc \times 0$.

Fifth, the limitation of tensile stress in web reinforcement to 12,000 lb. per square inch is a matter requiring explanation in view of the admitted capacity of mild steel to withstand the safe working stress of 17,000 lb. per square inch. If proper methods of calculation are adopted there is absolutely no justification for this anomalous restriction.

In paragraphs (36) to (38), following the tables, there is further uncertainty following the ambiguous use of the word "direct." It is very desirable for this to be cleared up.

Grip Length.—With the exception of the points stated below, this section is judicious, particularly in requiring that "additional security shall be provided by fish-tailing the ends of the bars or by bending the ends of the bars into a J form or by mechanical bond.

The points against which an emphatic protest must be entered occur in the following sentences:—

"In the case of a bar having mechanical bond the least diameter of the bar may be measured from outside to outside of the transverse projections, provided—

(*a*) That the transverse projections are not further apart centre to centre than twice the normal diameter of the bar;

(*b*) That the height of such projections above the normal surface of the bar shall be at least $\frac{1}{16}$ in. on all bars exceeding $\frac{1}{2}$ in. in diameter, and $\frac{1}{32}$ in. on all bars not exceeding $\frac{1}{2}$ in. in diameter."

While (*a*) limits the spacing of projections, it does not say whether the limits are to be applied longitudinally or transversely, or both longitudinally and transversely. Assuming the last alternative to be a correct interpretation, it would be quite open for anyone to employ a circular bar with three continuous ribs of any desired thickness projecting from the main body of the bar, and if the bar were of $\frac{3}{4}$ in. diameter the ribs could be made according to (*b*) to project to any distance exceeding $\frac{1}{16}$ in. Thus, taking the case of a $\frac{3}{4}$-in. diameter bar with three ribs $\frac{1}{16}$ in. thick each, projecting $\frac{1}{32}$ in from the body of the bar, the least diameter according to (*a*) could be measured at $1\frac{5}{8}$ in. We cannot see why the regulations should suggest so misleading a method of measurement. It serves no useful purpose and can only lead to confusion.

Moreover, the case we have assumed of a very undesirable kind of bar, complying with the terms of paragraphs (*a*) and (*b*), shows that, in addition to specifying minimum heights of projections, the regulations should also state minimum thicknesses and maximum heights for projections. They should also make clear the meaning of paragraph (*a*) and denote the main body of the bar by words more expressive than the somewhat inappropriate word "normal."

Modular Ratio.—In this section the ratio (m) of the elastic modulus of steel to the elastic modulus of concrete is arbitrarily specified at the value of 15, on the assumptions that the elastic modulus for all kinds of steel will always be approximately 30,000,000 lb. per square inch, and that the elastic modulus for all varieties of concrete will always be approximately 2,000,000 lb. per square inch.

There is no doubt whatever that for mild steel complying with the British Standard Specification, and for concrete made in accordance with the provisions of the proposed regulations, the value $m = 15$ is a very fair average. But in view of the fact that the alteration of existing laws is a very difficult and tedious operation, we should like to have some provision for altering the arbitrary ratio, $m = 15$, to suit any special qualities of steel that may hereafter be introduced, and to comply with any well-authenticated data that may be forthcoming to justify the acceptance of higher or lower values for the elastic modulus of ordinary or special qualities of concrete. By reserving power to exercise a little elasticity the Council will be able to avoid possible harm to an important branch of building construction, and will be placed in the position of being able to keep their regulations up to date in respect of this far-reaching ratio, to which the value now assigned with general consent is nothing more than an approximation, sometimes far below and sometimes far above the value obtaining in actual practice.

Part III.—Beams.

Paragraphs (48) and (49), demanding that "The least diameter or thickness of the longitudinal bars in beams shall not be less than $\frac{1}{2}$ in.," and that all other reinforcements in beams "shall be at least $\frac{1}{4}$ in. in diameter or thickness," are in direct violation of the fundamental principles of reinforced concrete design, and their tendency will be in the direction of barring the way to improved forms of construction.

In order that the concrete in tension may be enabled to develop its full extensibility so as to make the elongation under stress (even though resulting in part from very minute and uniformly distributed hair cracks) very much greater than that of plain concrete, the steel employed as reinforcement must be in bars, rods, or wires of small section—the smaller the better from the theoretical standpoint. This being the case, it is clearly unwise to make any regulation calculated to shut out some methods and forms of reinforcement already in existence, or that may hereafter be devised to ensure closer adherence to theoretical principles. The same remarks apply also to the subsequent section on "SLABS."

Compressive Reinforcement.—As in the R.I.B.A. Report, no formulæ are given for the design of beams with reinforcement in compression. The only guidance afforded is the statement that "the sectional area of the beam in the plane of the reinforcement may be assumed to be increased by fourteen times the cross-sectional area of the steel in compression."

This method of computation by the aid of what is termed an "equivalent section" may be understood by experts, but we are sure it will not be found useful to the average designer. There is far too much left to the imagination and to be ascertained by a special course of study, and a series of readily understood formulæ is much to be desired.

Shear Reinforcement.—We have already commented on the misunderstanding repeated in the regulations with regard to shearing stress and tension on diagonal planes, and need only refer the reader to our remarks under the head of "Working Stresses."

Resistance Movements.—Paragraph (64) states the customary assumptions on which are based the formulæ afterwards given for the design of beams. The basis is the same as that implied in the R.I.B.A. Report, but the assumptions are more fully stated.

Notation.—Following the example of the R.I.B.A. Committee, the County Council have adopted the code of Standard Notation proposed by the Concrete Institute. This is a welcome development, and if the Institution of Civil Engineers also fall into line it may be taken for granted that use of the notation will become universal in this country.

Formulæ.—Paragraphs (66) to (78) give equations for rectangular and tee-beams, virtually identical with the formulæ of the R.I.B.A. Committee, but differently and more conveniently arranged. A point of considerable importance is the definite and exclusive adoption of this particular series of formulæ by the Council. We agree that the straight-line theory, thus legalised to the exclusion of all other theories, is one that has found general favour on the Continent and in America. It gives safe results, and the formulæ can be written in and reduced to very simple terms for everyday practice. Still, it must not be forgotten that other theories are in existence, some based on theory and substantiated by careful investigation, and others based on the results of long experience. Consequently, there is some reason in the argument that well-tried formulæ should be officially recognised, and we must not lose sight of the possibility that powerful reasons may be forthcoming at a later date for the adoption of formulæ interpreting more faithfully than those of the straight-line theory the actual behaviour of reinforced concrete beams. We adopt no partisan view in this matter, and simply propose that the adoption of the straight-line theory and resulting formulæ should be qualified by words empowering the Council to accept other theories and formulæ which they may approve from time to time. Such a loophole would act as a safeguard against any undesirable obstacle being built up in the way of future progress in design.

Part IV.—Pillars.

In the first paragraph of this section it is said:—"The term 'pillar,' when used in these regulations, shall be deemed to include any pillar, pier, post, column, detached support, or any other vertical compression member." This comprehensive and satisfactory definition covers all vertical compression members, but has no reference to compression members placed diagonally or horizontally. Therefore, the scope of Part IV. ought to be enlarged so

as to cover pillars and struts, no provision being made anywhere else in the regulations for diagonal or horizontal compression members. It is singular that the omission should have escaped the notice of the County Council and the four professional societies to whom the draft regulations were submitted. Our readers will remember that the R.I.B.A. Report is free from the same criticism for the reason that the corresponding section is entitled "Pillars and Pieces under Direct Thrust."

A good provision in paragraph (86) is one specifying a progressive diminution of the working stress with the increase of the ratio of length to the effective diameter, beyond the value $ld = 18$.

Paragraph (87) determines the proportion of the maximum permissible pressure on pillars fixed in different ways, another useful statement.

The remainder of the section on pillars is very similar to the corresponding section in the R.I.B.A. Report except that it affords no guidance to the design of pillars under eccentric loading. In other respects it is preferable as allowing rather more latitude to designers and being more definite on points of practical detail. It is very much open to question, however, whether the Council have not been premature in adopting the distinctions drawn by the R.I.B.A. Committee as to the relative values of helical, circular, and rectilinear, lateral reinforcement. At the present time there are no authoritative independent data which conclusively prove the attitude assumed. We are quite aware of all that can be said in favour of helical reinforcement, and equally aware of practical objections advanced against its theoretical advantages, and prefer to reserve our judgment. If the new regulations are sanctioned as they stand, the effect will obviously be to make all firms who submit competitive designs adopt helical reinforcement. Whether such a result is likely to improve reinforced concrete design is a controversial point. It seems clear to us that the County Council ought to proceed cautiously in accepting theories that are not unequivocably established.

Part V.—Walls.

This is a very welcome section permitting enclosing curtain walls of reinforced concrete to be built not less than 4 in. thick providing they are adequately designed, and enclosing curtain walls of brick in reinforced concrete framework to be not less than 8½ in. thick for the topmost 20 ft. and 13 in. for the remainder of their height. The section includes some necessary stipulations as required to ensure safety and proper construction.

Part VI.—Foundations.

Comment on this section is unnecessary, as it merely repeats the limits of pressure on earth and plain concrete which were given in the regulations for steel-frame buildings.

Part VII.—Protection.

The stipulations here made as to the protection of reinforcement from fire are the same as those of the R.I.B.A. Report, on which we commented favourably a short time ago.

Part VIII.—Materials.

Cement.—The adoption of slow-setting Portland cement in accordance with present and future British Standard Specifications will satisfy all concerned, but the arbitrary establishment of 90 lb. per cubic foot as the weight of cement is both unnecessary and inadvisable for reasons given on a previous occasion.

Sand.—There is nothing objectionable in the three paragraphs here included.

Coarse Material.—Under this head we are glad to find that coal residues, slags, and stone liable to disintegration are rigorously excluded. Another good point is the stipulation that aggregate shall be varied in size as much as possible within the permissible limits.

Concrete.—Although the section entitled "Working Stresses" provides for only two mixtures of concrete, we have a third mixture here in the proportions of 1 : 1 : 2, the working stress on which is 900 lb. per square inch if we take the safety factor stated under the head of "Pillars." It would be very inconvenient for users of the regulations to be obliged to search through three distinct sections before finding the information that ought to be collected together in one place, and we hope this clerical defect will be set right.

Paragraph (133), stating that "all three materials should be thoroughly mixed dry and then thoroughly mixed again after wetting" can only be intended to apply to hand-mixing. Nothing is said about the superiority of machine-mixed concrete, the quality of water, and the consistency of concrete.

Despite the statement in paragraph (119) that "the quantity of cement shall be determined by weight," the regulations deal throughout with proportions by volume. It would be far better to adhere to actual weight for cement and volume for sand and aggregate, with due regard to the proportion of voids in the two latter materials.

Steel.—Paragraph (135) says that all steel shall comply with present and future British Standard Specifications for structural steel, or shall be any other structural steel which may hereafter be standardised by the Engineering Standards Committee. This is excellent as far as it goes, but it must be remembered that the object of the Committee is to promote uniformity among similar materials and products in general use, and not to put an official seal upon any new and improved materials and products that may be introduced. Consequently if one or a few steel-makers should succeed in producing metal possessing qualities making it specially valuable for reinforced concrete work, it could not be expected that the Engineering Standards Committee would immediately standardise such metal, and the County Council, being bound by the wording of this paragraph, would be debarred from allowing the employment of the metal even if they believed such a course to be in the public interest. For these considerations we propose that the words "or which may hereafter be sanctioned by the Council" should be added to paragraph (135).

Paragraph (136) supplements the table of working stresses previously given, by stating that "the working tensile stress on such other structural steel which may hereafter be standardised shall not exceed :—

(*a*) One-fourth of its ultimate resistance ;
(*b*) One-half the stress at the yield point ;
(*c*) Twenty thousand pounds per square inch, whichever is the least."

Regarding (*a*), we may point out that the ultimate resistance of steel is not a reliable factor in reinforced concrete construction, because for all practical purposes the limit of resistance coincides with the yield point of the reinforcement. Therefore it is more satisfactory to base the working stress on the stress at the yield point, as in (*b*).

The proposed limit of 20,000 lb. per square inch, stated in (*c*), is quite reasonable (but if anything somewhat excessive) for steel with the elastic modulus of about 30,000,000 lb. per square inch, and for such steel provides an assurance that minute hair cracks in concrete, arising from the inability of that material to stretch to the extent demanded by the stretching of steel under stresses exceeding a few thousands of pounds, shall not develop into cracks of undesirable width.

But as the stipulation refers to future qualities of structural steel, it is impossible at the present time to fix 20,000 lb. per square inch, or any other limit of working tensile stress. For instance, if steel were produced with the yield point of, say, 60,000 lb. per square inch, and the elastic modulus of, say, 40,000,000 lb. per square inch, the working tensile stress of 30,000 lb. per square inch might reasonably be permitted, and we should like to see the County Council in the position of being able to act suitably, instead of tying their own hands by prophetic limitations.

The two sentences (*a*) and (*b*) in paragraph (137) refer to the dimensions of transverse projections on mechanical bond bars, and require amendment as indicated under the head of "Grip Length," where the same sentences occur in the regulations.

It should also be stipulated that the sectional area of steel in deformed bars shall be measured on the core, or main body of the bar, and nothing allowed for projections unless the latter are continuous from end to end of the bar.

Part IX.—Tests and Testing.

We are fully in accord with the provisions of this section, the effect of which will be beneficial in every way. There is only one suggestion to be made, namely, that tests should be conducted at the request of the District Surveyor on selected beams or floor bays, even in the absence "of any sign of weakness or faulty work"—see paragraph (143).

Part X.—Centering.

Apart from the American form of spelling here adopted, no comment is needed on the brief but explicit general directions here given.

Part XI.—Workmanship.

Although short, this concluding section conveys a number of useful hints to building contractors on the execution of work in reinforced concrete. It should be noted that paragraph (157) specifies circumstances in which tests, not mentioned in Part IX., must be conducted. This paragraph might conveniently be printed under the special heading devoted to "Tests and Testing."

Conclusion.

Supplementing the foregoing comments, we wish to say that the draft regulations bear evidence of having been compiled with much care and an obvious wish to provide safeguards for the public without placing unreasonable obstacles in the way of designers and contractors. Limits of space have debarred us from mentioning specially all the good points of the code, and we take this opportunity of saying that our suggestions have been made solely with the object of conducing to the further improvement of a draft which reflects much credit upon all who have been concerned in its production.

FOUNDATION LOADS.—III.

THE need for accurate determination of the safe bearing power of soil concerning whose resistance any doubt may exist could be illustrated by numerous examples of subsidence and other movements. We will here refer to only two or three typical cases, showing the undesirable developments which may take place if not prevented by measures dictated by ample information obtained before the commencement of building operations.

One of these is that of a massive structure covering a considerable area and having masonry walls, with footings of ample dimensions for soil of average quality. The site is on sloping ground, the back portion being a few feet higher than the level of the street in front. After completion of the building a crack appeared in one of the main walls, and continued to open until it extended through the full height of the wall and into the roof. This evidence of unequal settlement naturally suggested the desirability of investigation into the nature of the subsoil, as a result of which it was found that below the superficial layer of earth a bed of hard blue shale existed beneath a part of the site, and that the remaining part was supported by decomposed shale absorbing water readily and incapable of carrying considerable loads.

Another case is that of additions to a large church founded on alluvial soil of great depth. The old foundations had gradually settled down and come to rest many years before—a process which was repeated in connexion with the new works. The consequences were the development of various ugly cracks and much anxiety to the eminent architect commissioned by the authorities. The new foundations were doubtless perfectly safe in themselves, and there might have been no trouble if they had not been connected with older work. If careful tests had been made in advance it would have been quite possible to adopt measures for the consolidation of the soil and the distribution of the load so as to reduce settlement to insignificant proportions.

Again, we have in the history of a recent bridge founded on London clay one more proof of the necessity for the investigation of bearing capacity. The structure to which we refer was originally intended to have masonry arches, but after the abutments and river piers had been partly completed some doubt arose as to the advisability of imposing upon the soil the loads at first contemplated. Experiments were then made by the consulting engineer, and the final upshot was the abandonment of masonry in favour of steel arches. Had the tests been made at an earlier stage considerable outlay would have been saved, and the design of the structure would have been at once more graceful and better adapted to navigation.

Nothing elaborate in the way of apparatus is required for testing the bearing power of soil. The first thing to be done is to lay bare, at selected points on the building site, small areas of the bed upon which the

proposed foundations are to be constructed. This means the digging of small test pits, at the bottom of which a bearing surface should be prepared and levelled. The surface can then be loaded in any convenient manner, and careful observations taken of the settlement. Speaking in general terms, the results given by a very small test area are apt to be misleading unless the operator possesses considerable experience in work of the kind. For instance, while a very heavy proportionate load might be sustained by a small area for a short time without appreciable result it does not follow that a large area would be capable of supporting the same unit load permanently.

We mention this point because load tests are sometimes made on a rather microscopic scale.

In the case of the State Capitol of South Dakota, U.S.A., the soil was tested by excavating pits to the depth required by footings at a number of places on the building site. The bearing surface was prepared at the bottom of each pit under the supervision of the architect, great care being taken to dress and scrape the ground to a smooth horizontal surface. The testing apparatus consisted of a 12-in. square post, 6 ft. long, whose ends were cut perfectly square, and at the upper end of which was fixed a horizontal platform 6 ft. square, suitably braced by cleats and struts. Before loading the platform the foot of the apparatus was accurately seated, and levels were taken to ascertain the exact height of the platform. After application of the load observations were made to show the time when the settlement commenced and the extent of the movement. As the computed foundation load was 1½ tons per square foot the testing apparatus was loaded up to 3 tons, and the general result was a settlement of 3-16 in., but nothing more after about twelve hours had elapsed.

Even after the tests had shown the ample bearing power of the soil precautions were by no means at an end, for during excavation of the foundation trenches the ground was carefully examined with the object of discovering whether any soft places existed requiring special treatment. It was found that in some points the material was not so solid as could be desired, and to guard against any tendency to unequal settlement the footings were made continuous through the main walls, and in addition were reinforced by steel bars.

Another interesting illustration of careful investigation into the actual nature of subsoil is furnished by the case of a bank building in Toronto, the architects having been informed that the site was on a thick bed of hard clay with almost unlimited bearing power. This estimate of resistance was based on the behaviour of adjacent buildings of no great height, and although these were perfectly safe and free from settlement, it was found that higher buildings with deeper foundations could not be erected with confidence unless special provision was made against settlement. At some remote period the site had formed part of a lake bottom, and consisted of clay hardened near the top to form a very hard crust, below which the clay was quite soft, resembling putty in consistency. In order to obtain reliable data tests were made with simple apparatus of the kind described above. No movement occurred until the load of 2½ tons had been imposed on the area of 1 sq. ft., when the measured settlement of ⅜ in. rapidly occurred, and on the following morning had increased to 1½ in. while still under the same load. Nevertheless, the results so obtained were not considered to be conclusive as to the actual capacity of the soil, because the isolated area tested was not under the same conditions as an equal area beneath a large footing. Consequently, a supplementary test was made under conditions reproducing more closely those foreseen in the projected building. The apparatus used this time consisted of a 6-in. diameter pipe with a cutting edge driven about 8 in. into the clay. Inside the pipe an oak piston was inserted, its lower end being squared, and the upper end projecting from the pipe was provided with a loading platform guided between pieces of timber. Pig-iron was placed on this platform, and no settlement occurred under the load of 5 tons per square foot. Therefore 4 tons per square foot was taken as the safe uniform load. The foundations were designed on this basis, and since the completion of the building in the middle of the year 1907 no movement has been detected.

Having ascertained the safe bearing power of the soil in any given place where building operations are intended it will be necessary to take account of local and individual conditions before commencing the work of foundation design. The safe load per square foot for a church tower or factory chimney should obviously be much less than that for a lower structure.

HOMOGENEITY AND IMPERVIOUSNESS OF BETON.

THERE is only one way to make beton impervious, and that is to ensure that the amount of cement used exactly fills all the voids in the aggregates; and this can be attained only by proper calculation of these voids, and by ensuring homogeneity by means of thorough mixing.

Calculation alone will not ensure this result; for if the mixing be not thorough, voids unfilled with cement will remain, as shown by a proportionate excess of the obtained over the calculated volume of beton. Thorough mixing alone may ensure homogeneity, but if there be not sufficient cement to fill the voids empty spaces will result, which will lessen the imperviousness of the completed mass. If some portions of the mass contain too much cement and the others too little, as the result of improper mixing (and, as often occurs with continuous mixing machines, with hasty mixing with batch machines or with careless hand-mixing), there will be in the mass spots or stripes which will be pervious to water.

The problem is usually to secure a high degree of resistance to pressure with maximum imperviousness; in beams it is also desirable to attain a good resistance to tensile stresses. Where imperviousness is the main object, this should be secured by a minimum amount of bond; but as usually attempted this desired result is not attained, simply from ignorance of or neglect of the proper proportioning of aggregates.

It is easy to see that if we have a number of incompressible spheres of the same diameter the voids between them will be of the same size, and that the proportion of each void to the volume of the spheres is independent of the diameter of these latter. It is equally easy to see that if we can calculate the size of the voids, we can fill a large portion of each one by a sphere, and that by calculation or otherwise we can find out what diameter of sphere will largely take up the smaller and more numerous voids between the two second larger spheres and the larger ones, and with each other.

What is true of spheres is equally true, although to a lesser extent, or to a less practically applicable extent, of all other regular forms, symmetrial about all three axes. It is also true, but in lesser degree, of less symmetrical forms, or of those which are symmetrical about only two axes.

This being the case, we can see that, while calculation of the voids between irregular masses, such as are used as aggregates in beton mixing, would be impossible, we can still obtain the most thorough filling of the voids between the larger pieces of stone by means of a much cheaper material than cement—namely, by smaller pieces of the same material, or by gravel or sand, by separating the various kinds of material and the sizes of each material, and making tests of various proportions of the different sizes and kinds. That particular mixture or proportion which results in the least increase of volume per weight, or in the greatest weight per unit of volume, is the one which leaves the least space to be filled with cement. It is also evident that up to a certain point (to be determined by experiment) the longer the various components are mixed the less the resultant volume will be.

In making these experiments the prices of the various aggregates should be taken into consideration.

An exact test of the voids in each kind of aggregate alone, or of each successive mixture, may be made by determining the volume of water required to fill all the voids in a measured vessel, full of the aggregates in question, but this will underestimate the amount of smaller aggregates or of cement necessary.

It will pay every contractor who has much to do with beton to measure out a cubic foot or a cubic yard of each material which he employs as aggregate, and to determine, by the water test, the amount of smaller aggregate requisite to fill the voids therein. These tests should include not only each kind of aggregate and each size thereof by itself, but various combinations of different sizes of the same aggregate, and of two or more different materials of different sizes.

From the data thus tabulated (and which will, of course, be in volumes only) there should be made one of weights only, and of percentages of volumes and of weights, and these should enable the contractor to effect the most economical and the most satisfactory mixtures.

APPLYING CEMENT MORTAR BY COMPRESSED AIR.

WHEN concrete or cement mortar is applied as a protective covering to structural steel work, the ordinary method is to surround the steel members with wooden forms and pour the wet mixture into place, some form of wire mesh or metal lath being employed as an anchorage; but a radically different arrangement is adopted in covering the steel work which forms an important feature of the reconstruction of the Grand Central Terminal yards of the New York Central and Hudson River Railroad in New York City. The essential parts of the "cement gun" there used consist of superimposed steel tanks forming two compartments, from the bottom of which a dry mixture of sand and cement, entirely under the control of the operator, is ejected by compressed air through a hose line carrying a nozzle at its discharge end. To this nozzle a second and smaller hose delivers a supply of water under pressure. The mixture of sand, cement, and water shoots out of the nozzle orifice with considerable force and impinges upon the surface of the steel work at which it is pointed. The mortar issuing in the form of a spray adheres to the surface of the steel and forms a coating which may be made as thick as desired. The discharge of the cement and the sand is regulated by varying the speed of a large feed wheel at the bottom of the lower compartment, which has deep notches around its entire circumference. This wheel is revolved by a small compressed air motor, and the small charges of the sand and cement mixture collected in the notches or pockets around the periphery of the wheel are fed successively into the rapidly-moving stream of air which issues from the inlet connexion. The material is blown through a curved outlet and passes thence into the hose line supplying the discharge outlet of the gun. The quantity of air required for working the gun depends upon the condtiions under which it operates and the nature of the work to be done, and this is also true of the water used to hydrate the cement. The nozzle through which the mixture is discharged is designed to secure the thorough hydration of the cement, and that portion of it which is exposed to the abrasive action of the sand is lined with a composition that can be readily replaced as wear takes place. The water comes in contact with the mixture of cement and sand just as it passes through the nozzle, which is furnished with an annular chamber from which the water is sprayed under pressure from a series of carefully-proportioned orifices, and the hydration is begun there and continues until the surface to be covered is reached. The mixture issues from the gun nozzle at a velocity of about 350 ft. a second, and when it strikes the steel surface the large and coarse grains of sand rebound until the thin film of fine cement mortar which immediately adheres to the steel offers a plastic base in which the coarse particles become embedded; the mixture then builds up to any desired thickness upon this film. It is apparent, therefore, that when the swift moving stream of material hits the steel surface, and between that time and the instant when the mortar cover begins to build up, there is a tendency for the sand grains to clean off any rust after the manner of an ordinary sand blast. The deposition of the thin film of cement against the steel is advantageous as it secures an excellent bond and makes an efficient protective covering over the metal. As the cement is literally shot upon the steel a coating of great density is secured, while the force of the impact drives out all superfluous water and the concrete takes its initial set in a very short time, all possibility of voids or air pockets benig avoided.—*The Times.*

REINFORCED CONCRETE BRIDGE AT UNIVERSITY COLLEGE, CORK.

SPANNING a branch of the River Le passing through the grounds of University College, Cork, a reinforced concrete bridge has lately been built from the designs of Mr. J. H. de Warenne Waller, an old student of the college now occupying a responsible position on the construction of the new bridge at Waterford. The new bridge is 72 ft. long over all, 68 ft. between abutments, and provides for a roadway 16 ft. wide.

The work is interesting, not because of the size or importance of the undertaking, but rather for the reason that its construction presented a problem commonly encountered in practice—the construction of a bridge at moderate cost and of pleasing appearance.

The question of economy is answered by the statement of Professor C. W. L. Alexander to the effect that tenders had shown the cost of a steel bridge to be much greater than one of reinforced concrete, and to this there was to be added the cost of painting—probably 6*l.* or 8*l.* a year.

The æsthetic question is best answered by the view reproduced at the head of this article, where it will be seen that the bridge is of the girder type, with panelled sides and simple but effective latticed parapets. An arch would certainly have been more effective, but was impracticable owing to the low level of the ground at either side and the necessity for allowing ample clearance for the flow of water under the bridge.

The former structure on the site was constructed of Oregon pine and had been in service about twenty-seven years. Frequent repairs were necessary, the cost of maintenance having been 17*l.* a year, and finally the bridge became so decayed as to be beyond repair. The governors of the college then invited tenders from four steel firms, and alternative tenders to the design prepared by Mr. J. H. de W. Waller.

The subjoined particulars relative to the latter are taken from a paper read by the designer to the Institution of Civil Engineers of Ireland, to which body we are indebted for the illustrations reproduced in the present article.

Of the four steel firms invited, two sent in designs, one for a single span at the cost of 452*l.*, erected on foundations to be prepared by the owners and exclusive of masonry and road work, and one for two spans at the cost of 265*l.*, excluding cartage from the quay, foundations, centre pier, and road work. The reinforced concrete bridge cost 235*l.* 12*s.*, exclusive of the items omitted from the tenders for steel, thus effecting an initial economy of about 12½ per cent. and an annual saving of at least 6*l.* for maintenance.

System.—In this bridge the design and construction do not follow the lines of any patented system, but are based upon what the designer believed to be the most desirable features in several systems. Figs. 1 to 3 are an elevation, half-section, and half-plan, respectively, of the bridge.

The reinforcement consists of plain round steel bars, most of them bent and some straight, the ends of all being crooked for anchorage. Special bars were introduced over the centre support to provide resistance to stresses caused by continuous beam action. The bottom layer of bars are made to overlap 6 ft. at the support, to provide against tensile stresses that may arise if settlement of the central pier should take place.

The vertical spacing of the main bars, as shown in Fig. 2, is worthy of attention. The two sets of bars are not placed close together, as is sometimes done, but are kept separate by one inch of concrete to make provision for the transference of stress from the steel to the concrete, in accordance with the recommendations of many independent authorities.

The form of stirrup used in the main beams is one adopted by Mr. A. L. Johnson, a well-known reinforced concrete specialist in the United States. The stirrups are made from ¾-in. round steel rods, the upper ends being bent down so as to rest upon the upper edge of the beam mould (see Fig. 2) during the deposition of concrete, and therefore not only receiving support itself, but affording excellent means of holding the main bars in position.

The stirrups in the outer beams are a modification of those in the two inner beams of the bridge. In these only one side of the stirrup rested on the beam mould, and the other side was supported by means of a plank fixed temporarily, so that the cranked end of the stirrup hooked over it.

Both varieties of stirrup have the

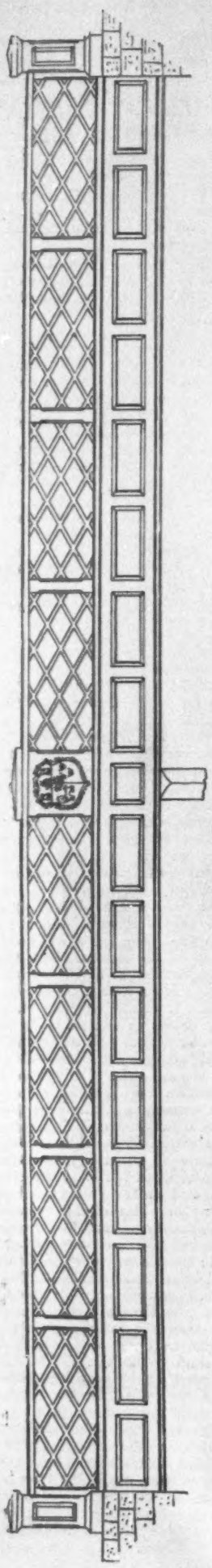


FIG 1. ELEVATION.

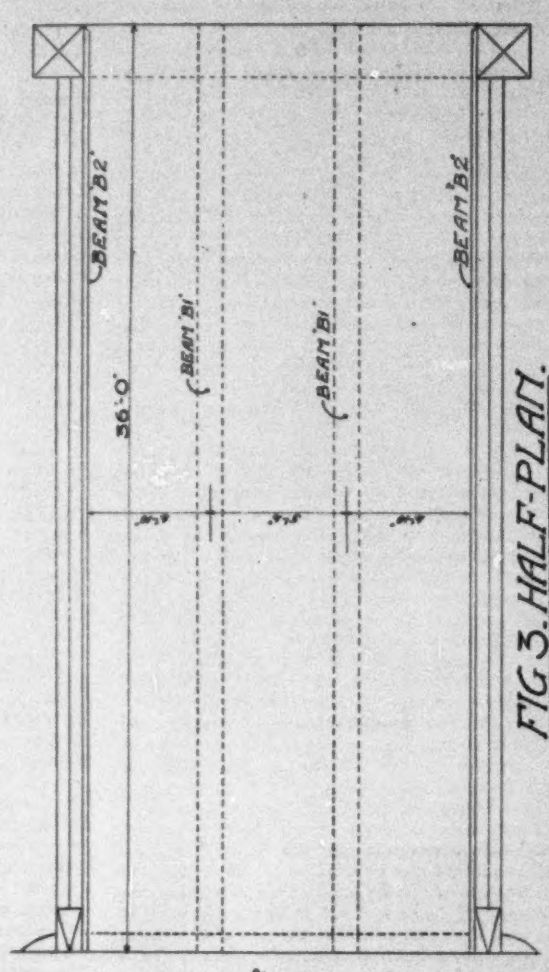


FIG 3. HALF-PLAN.

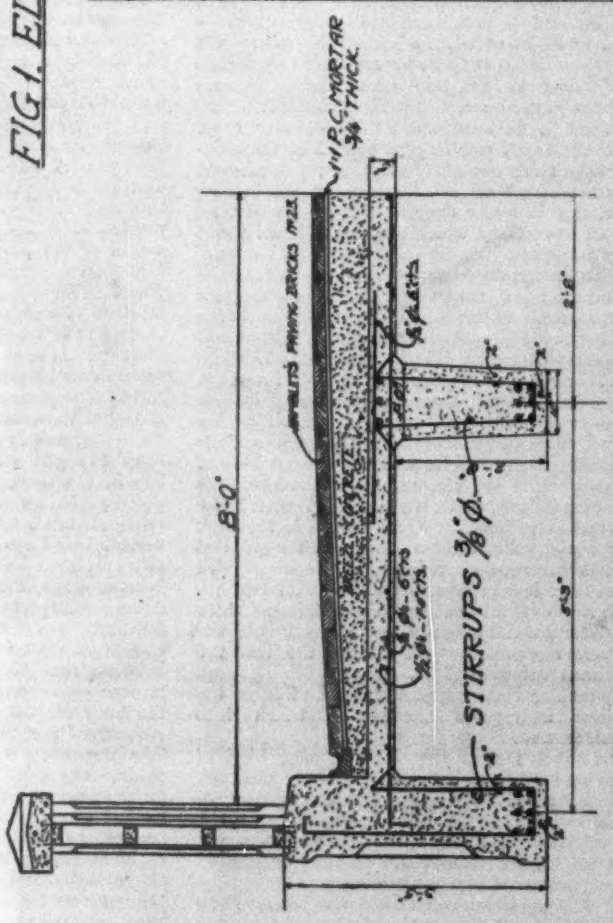


FIG 2. HALF-SECTION.

A Reinforced Concrete Bridge, University College, Cork. (From the Transactions of the Institution of Civil Engineers of Ireland.)

disadvantage that the ends penetrate through the outer surface of the concrete, thus leading to the creation of rust spots and affording loopholes for the entrance of moisture to the interior of the construction. These drawbacks are sufficiently serious to make the form of stirrup in question undesirable for adoption.

The last matter for mention under the present head is the question of the formation of joints between concrete already set and fresh concrete laid after the temporary suspension of work. The specification required the concreting of the deck slab to be done with only one vertical joint over the centre pier, but before the work was commenced the contractor undertook to concrete the whole in one operation, so as to avoid the joint altogether. In a small bridge such as that at Cork the alteration offered no difficulty.

Calculations.—After the bending moments had been accurately determined, the beams and connecting-slabs were computed by formulæ based on the straight-line theory, and therefore essentially the same as those adopted by the R.I.B.A. Committee.

Considerably more web reinforcement was provided than the amount required by the formulæ in order to bind the upper and lower parts thoroughly together. As the total cost of the stirrups was under 3*l.*, it is evident that little is to be gained by attempts at economy in web reinforcement, the proper course, in our opinion, being to allow nothing for the resistance of the concrete to web stresses, because the most important of these is tension on diagonal planes.

The bending up of the main bars was effected as near to the ends as was permitted by the reduction of bending moment towards the middle of the span, the angle of the inclined portions being 30 deg. to the horizontal.

Ornamentation.—The decorative treatment of the bridge is found mainly in the panelled sides of the outer beams and in the balustrade. The diamond-shaped lattice panels might certainly have been improved upon, although, as may be judged by the photograph, they have a rustic appearance by no means inappropriate to the surroundings of the bridge. On the middle pier of the parapet are placed the arms of University College, which were modelled in clay by Mr. J. J. O'Brien, of the Cork School of Art, and cast in neat Portland cement.

Concrete.—Subject to modifications governed by the actual percentage of voids in the aggregate, the concrete was mixed in the proportions of 1 : 2 : 4. The aggregate consisted of one part stone broken to 1 in. gauge, and two parts river gravel, from ¼-in. to ¾-in. gauge. Sand was supplied from the Ballinacurra pits near Midleton, and cement was supplied capable of passing the standard tests, and in addition a tensile test on briquettes at the end of three days, and the usual pat tests for soundness.

By the addition of sufficient water the concrete was mixed so that it would flow slowly when agitated. It was poured into the moulds and worked into place with pieces of batten sharpened to a chisel point at one end.

In the central pier the concrete under water was deposited by the aid of a 6-in. square timber shoot. The concrete was put in dry at the top, the lower end of the shoot was then gently lifted off the bottom, allowing the concrete to flow into place, the shoot being kept well filled so that no concrete could fall directly into the water.

The lattice panels of the parapets were cast separately and afterwards fixed in position. They were formed in moulds made in halves, each half having a bevel of ¼ in. towards the middle, so as to permit of ready withdrawal. The concrete for the panels consisted of crushed limestone and sand in equal proportions, and the reinforcement consists of ¼-in. round rods placed near both faces of the work.

Each of the balustrades was cast in one operation, the lattices and ornamental shield were placed in position, the moulds for the piers, posts, and top rail were fitted closely around them, and the whole concreted up.

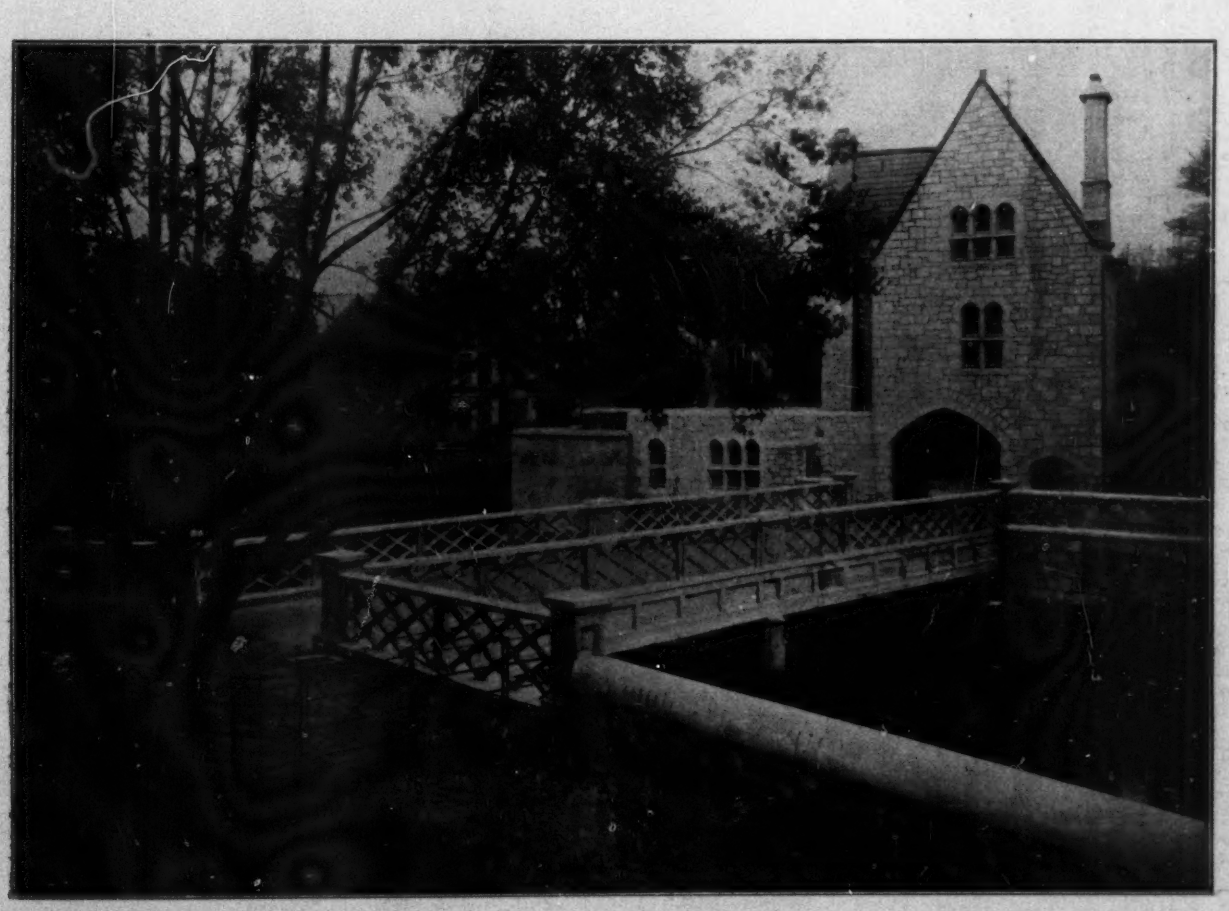
Foundations.—The two end supports of the old bridge were quite capable of carrying the vertical load of the present bridge, and needed little alteration. The river supports were cast-iron columns and unsuitable for the new design, but, being well founded, were left in place and incorporated in the central concrete pier. Between the cast-iron columns were driven ten 10-in. square pitch-pine piles, as shown in Fig. 8.

Road Surface.—Before laying the road bed the top of the deck slab was covered with three coats of coal-tar, thinned with petroleum. Then was added a layer of coke-breeze concrete, and over this paving of blue Staffordshire brick.

Cost.—The total cost of the structure was as follows, including fees for the design :—

Central pier, including 10 piles and 9 cubic yds. of concrete	£53	0	0
Bridge beams and decking concrete at 50s. per cubic yard	114	0	0
Reinforcement (total) at 1¼d. per ton, including labour	55	0	0
Balustrade, 144-ft. run, excluding ornamental shields	42	9	0
Road filling and paving	52	0	0
Other items	84	17	0
Total cost	£401	6	0

The contractor was Mr. Antony Gaul, of Cork, who carried out the works to the satisfaction of all concerned.



Reinforced Concrete Bridge, University College, Cork.

(From the *Transactions* of the Institution of Civil Engineers of Ireland.)

THE BUILDING TRADE.

THE BUDGET AND THE BUILDING TRADE.

IN the recent debate on the Finance Bill the Chancellor of the Exchequer conceded that "sooner or later" there would have to be an inquiry into the system of land valuation. This is a course the necessity of which we advocated in a recent article on "Increment Value" (the *Builder*, September 8 last), and we can only hope that the inquiry may be granted sooner rather than later. In our article on the original Budget resolutions, May 1, 1909, we pointed out that it was the small householder who would be the chief sufferer under the new departure in taxation, and now that the taxes have been in operation for nearly two years abundant evidence is forthcoming that our opinion was justified. Increment value duty is levied upon an uncertain basis, and those who can ill afford to contest the Government valuations are those who have to bear the heaviest burden of taxation. Building development is also seriously hindered. The expressed intention of the promoters of the new taxes was that the increment value duty should only represent an improvement in the value of property apart from its enhancement by any act on the part of the owner. Even if this principle were strictly adhered to the assessment of the tax involves an expensive and vexatious inquiry where a building estate has been laid out, and thus not only is the demand for house property lessened, but building development is hindered. The attitude of the Chancellor of the Exchequer towards the building trade does not appear to be wholly consistent. When he introduced the new taxation he assured his hearers that it would stimulate the building trade and throw open land which was being "held up." In his speech in the House, however, on December 13 last, he is reported as having said that "he had great hopes of the increase in the valuation of land. The House was told that the Government were ruining the building trade, that nothing was being done in the trade, that speculative building was at an end, and there was no building of houses except on demand. *He was not so sure that it was altogether a bad thing that they should only make the supply fit the demand.*" We have italicised this passage not only because it seems to contradict one of the intentions with which the new taxation was expressed to be introduced, but because it loses sight of the point which we have endeavoured to make clear above, that the demand itself has been checked, and checked severely, by the imposition of the new taxes.

In fairness we must add that Mr. Lloyd George himself denies that the building trade has been injuriously affected. In his Budget statement last May he contended that the figures relating to unemployment showed steady improvement (see the *Builder*, May 26), and again in the House he repeated the assertion. He relies, as we have frequently pointed out, on the figures contained in the *Board of Trade Labour Gazette*. These returns, however (as we showed in our issue for May 26), are only partial, referring to trade union carpenters, joiners, and plumbers, and, as was recognised in the actuarial report on Unemployment Insurance, taking no account of bricklayers, plasterers, painters' labourers, etc., to whom no unemployed benefit is paid.

If an inquiry is granted into the methods of valuation it is important that the position of various industries should be perfectly comprehended, and we have made the above observations because some misapprehension appears to exist as to the actual effect of the taxes on the building trade.

THE WEBB ORPHANAGE, CREWE.

This orphanage has been erected in connexion with a bequest made by the late Mr. F. W. Webb, who was for many years the chief mechanical engineer to the London and North Western Railway Company. The building was designed by Mr. J. Brocke, F.R.I.B.A., and the contract carried out by Messrs. Normanton, of Manchester.

THE EMPLOYMENT OF A SPECIALIST.

THOSE who supply electrical and other equipment for new buildings in the course of erection are generally known to the lawyer who draws a building contract as "specialists." So long as his money is safe, the question who employs him is a matter of indifference to the specialist. He may be employed by the architect and paid by the builder without knowing or caring who the building owner is. A cheque for 100*l*., drawn on the banking account of a solvent builder, is as good as the cheque of any building owner—perhaps better.

But, alas, solvency is not always met with in commercial affairs! Although he may have been solvent at the time he took the job on, the builder sometimes finds that he has grossly under-estimated. In the result, when the specialist sends in his modest bill he is met with the reply: "The builder filed his petition yesterday week." The specialist then casts round to find out whether he cannot pursue a remedy against someone who is solvent; and before doing so he must be able to show that he was employed either expressly or impliedly by that person. What, then, is the relationship created between the specialist and the building owner by the terms of an ordinary contract?

This matter was discussed very clearly and decided very definitely in a recent case tried by Mr. Justice Coleridge in the King's Bench Division. We refer to Young & Co. *v.* White (28 T. L. R. 87), where specialists for the supply of steelwork for a building were held entitled to sue the building owner as the real principal in respect of goods supplied through the building contractor. The facts were briefly these. The plaintiffs, who are specialists in steelwork, were asked by certain architects to tender for the steelwork on a building in the course of erection in Chelsea. The tender, which was to do the work for 229*l*., was sent in. Subsequently, the architects informed the plaintiffs that they were going to ask the builders to send the order for the steelwork; and on the same day the building contract was signed between the builder and the defendant, who was the building owner. Subsequently, the builder gave an order to the plaintiffs to carry out the steelwork "in accordance with your estimate and drawing sent to the architects dated July 20, 1910." Before the plaintiffs could obtain from the builders the sum of 150*l*., being the balance due on a certificate, the builder went into liquidation. Consequently, the specialists brought an action to recover the sum of 150*l*. from the building owner. Clause 20 of the contract provided that:—

"All specialists . . . executing any work or supplying any goods for which prime cost prices or provisional sums are included in the specification, who may at any time be nominated, selected, or approved by the architect, are hereby declared to be sub-contractors employed by the contractor; but no such sub-contractor shall be employed upon the works against whom the contractor shall make what the architect considers reasonable objection, or who will not enter into a contract with the contractor upon terms and conditions consistent with those in this contract, and securing the due performance and maintenance of the work supplied or executed by such sub-contractor. . . ."

It was contended on the part of the plaintiffs that when they contracted with the builder he was really the agent of the building owner, and this was agreed to by the court. Mr. Justice Coleridge said:—

"Generally, if the specialist supplies the goods or does the work for less money than the provisional sum allowed for prime cost, the owners get the benefit, and are entitled to a deduction on the whole contract accordingly. If the specialist charges more, the extra amount is added by the builder, and is an extra on the contract. This shows that the owner gets the benefit or suffers the loss of any lesser or greater amount payable in respect of prime cost. This does not affect the right of the contractor to his profit on the whole contract, which would probably include this item. Here the owner selects the specialist, obtains the tender, fixes the price, and has the real, if not the only, interest in the work that is done. The builder is not interested. If he unreasonably objects to the selection, he may be overridden. He may make no discount for himself, and if the owner chooses to pay the specialist direct he can do so. The form of the contract here and there may discover the builder apparently contracting as principal. The substance is that he contracts as agent where specialists are concerned."

It is difficult to overrate the importance of this decision having regard to the enormous amount of work which is done by sub-contractors and specialists in various parts of the country. For a thousand reasons the contractor may find it impossible to carry out the work which he has undertaken for the price named in the tenders and the specialist may be the first to suffer.

Nor does this decision of Mr. Justice Coleridge stand alone. He adopted the reasoning of Mr. Justice Channell in Crittall *v.* London County Council (75 J. P. 203). In that case the County Council contracted with building contractors for the erection of a building, for the purposes of which certain specialities were to be ordered from stated firms. Amongst the specialities were certain casements. Many months after the head contract was entered into, the building owners invited the plaintiffs to quote for the casements according to a specification, which provided that the amount of the accepted quotation would be inserted as "a prime cost item" in building contract; that the plaintiffs would enter into an agreement with the building contractor to execute and complete the casements within a given time under penalty; that the architect of the building owner would have power to vary the work; and that payment for the work should only be made on the certificate of that architect. The plaintiffs having quoted according to this specification, the building owners forwarded the quotation to the building contractors with a request that they should place the order with the plaintiffs. Subsequently, the building contractors informed the plaintiffs that they (the building contractors) had instructions to accept the plaintiffs' estimate for the casements. In an action by the plaintiffs to recover the balance of the price of these casements from the building owners, it was held that, while the contract for the casements was *primâ facie* a contract with the building contractors, it was also a contract made, in fact, by the building contractors acting as agents on behalf of the building owners as real principals, because it was to procure something for their benefit, and that on the facts of the case the plaintiffs were entitled to judgment (Hobbs *v.* Turner, 1902, 18 T. L. R. 235, followed).

Of course, it is to be said that these decisions may be overruled by the Court of Appeal. If they are upset, every specialist and sub-contractor will probably endeavour to ensure that when he enters into his contract he has a right both against the builder and the building owner.

LABOUR IN THE BUILDING TRADE.

A JOINT movement for improving conditions of labour in the London district in the woodworking and furnishing trades has been inaugurated as the outcome of private conferences between the following trade unions:—

Amalgamated and Associated Societies of Carpenters and Jointers.
General Union of Carpenters and Joiners.
National Amalgamated Furnishing Trades Association.
Amalgamated Union of Cabinet Makers.
Old West-End Cabinet Makers' Society.
Progressive Union of Cabinet Makers (London).
Perseverance Cabinet Makers' Association (London).
Independent Cabinet Makers' Association (London).

A proposed list of new working conditions has been drawn up and presented to the London building trade employers. Although it is hoped to carry through the negotiations without a strike, the societies concerned have decided on a levy of 3s. per member to form a fighting fund. The new proposals include the substitution of a 47-hour week for a 50-hour week during thirty-nine weeks of the summer; the raising of the minimum rate of wages from 10½d. per hour to 1s. per hour; the payment of time and a quarter for night work; and the payment of double rates for all overtime. The present practice is to pay time and a quarter for first two hours. It is also proposed that 1d. per hour extra be paid to men employed in fixing joinery which has been prepared outside the district, and that subletting for labour only be prohibited.

The bricklayers, plumbers, painters, and labourers employed within twelve miles of Charing Cross are also preparing programmes of new demands.—*Daily Chronicle.*

EDINBURGH MASTER BUILDERS' ASSOCIATION.

In the Royal British Hotel, Princes-street, Edinburgh, the annual dinner of the Edinburgh, Leith, and District Building Trades' Association was held on the 14th inst. About seventy gentlemen were present, and Mr. David Wilson, J.P., occupied the chair.

After the loyal toasts had been honoured, Mr. Robert Gilchrist, President of the Glasgow Masters' Association, proposed the toast of "The Edinburgh, Leith, and District Building Trades' Association." He said there was a great deal of depression in the building trade in the West. He appealed to masters to have regard to the fact that they must work together if they were to protect their interests.

In his reply, the Chairman said they had had during the year no serious trouble with any of the operatives' societies. Any small differences which had been brought under their notice had been adjusted by conferences in a most friendly way. It was a matter for regret that they were unable to employ as many men as they should like to employ. The ranks of the unemployed contained many of the building trade employees, and they saw little prospect of improving matters in the near future. Reports from the different branches of the Building Trades Federation showed that the building trade throughout the country was in a worse position than it was in Edinburgh, where they had had a number of public buildings to help them, although some of these contracts, owing to keen competition, were not very remunerative. To many builders in Edinburgh the year had been the worst of a succession of bad years. In December last year, and in the following month, property was changing hands freely, and they all thought prosperity was returning, but with new legislation in the air, House Letting Bills, Insurance Bills, and the effect of the increment duty, confidence in property as an investment was again checked for a time. It was time the Legislature gave the building trade a rest and let them have a chance of securing a return of confidence and a restored security in property. In regard to unlet property, they were told that builders were to blame for over-building. That was a mistake. The cause was not over-building; the condition they complained of was the effect of depopulation. The flower of their tradesmen had been driven from their homes abroad to get their daily bread. The effects of the Insurance Bill would be felt by the building trade in a greater degree than by most of the other trades. With regard to the unemployment part of the Bill, he said that section had been inadequately discussed. When framing the Bill the Chancellor of the Exchequer had consulted the employees' organisations, but no organised body of employers had been consulted. Their Committee had urged that workmen's compensation should have been included in the Bill as a contributory measure. Along with the English Federation an endeavour was being made to get the Government to make an inquiry into the working of the Workmen's Compensation Act. That burden had been increased fourfold since the introduction of the Act, and it was a very heavy item in the cost of production. Malingering was responsible for much of the increase, and only by a contributory scheme would that scandal be averted.

Ex-Bailie Forrest, in proposing "Kindred Associations," said the building trade was suffering more from lightning-speed legislation than any other trade. He thought they were at the end of their tether, and they were bound to assert themselves. He appealed to the building and allied trades to unite together so as to form one huge federation.

Replies were made by Mr. James A. Baxter, President of the Glasgow Master Wrights' Association; Mr. Arch. Watson, Vice-President of the Glasgow Master Plumbers' Association; and Mr. R. J. Henderson, Vice-President of the Edinburgh, Leith, and District House Factors' Association.

FACTORY AND COMMERCIAL PROPERTY SALES, 1911.

MESSRS. LEOPOLD FARMER & SONS, factory specialists and surveyors, of Gresham-street, E.C., report that the year under review has shown better results than was the case in 1910 in the disposal of factory property, wharves, land, etc. Values have been maintained and sales transacted at good times prices. The prices realised would not convey to the reader that the standard of values has been kept up, as hardly two factory properties are alike. The tendency, however, is for the price to rise consequent on the improvement by development in certain manufacturing districts, which have special advantages in rail, waterside, and other facilities. There is a migratory movement amongst manufacturers to districts outside large towns where the lowest possible cost of manufacture can be obtained. The Budget taxation of 1909 has not to any great degree affected the values of industrial properties, but as regards other securities in landed property a shrinkage is noticeable. There are many influences affecting industrial operations, and the development of commercial enterprise.

It is difficult to say which branch of any particular manufacture more than any other has progressed in the year 1911; one, however, perhaps, being very noticeable is the manufacture of electric filament lamps, and several companies interested in the business have acquired factories and are carrying on large businesses.

Acquiring of factories, etc., and building of works, consequent on reorganisation and extension in many trades, are always in progress; those in the engineering, milling, chemical, and spinning trades having been well to the front in development in the year under review.

The effects of the Patents and Designs Act are still well to the front; foreign holders of English patents still being on the look-out for factory property to comply with its requirements.

In looking ahead to further deals, Messrs. Farmer & Sons are confident of good sales, as there is every likelihood of a great amount of prosperous activity in the industrial world.

GENERAL BUILDING NEWS.

PROPOSED CHURCH, CHESTER-LE-STREET.

Plans for proposed Congregational Church have been prepared by Mr. Albert H. Fennell, architect, Chester-le-Street, Co. Durham. The front façade will be of stone in late Gothic style. The scheme is to cost about 3,250*l.*, exclusive of site and manse. Church seating 510, schoolroom seating 250, vestries, cloakrooms, cellars, etc.

NEW CHURCH, STEPPS.

The Building Committee of Stepps United Free Church has decided upon erecting a new church, and plans have been prepared by Mr. Andrew Balfour, F.R.I.B.A., architect, of Glasgow. The estimated cost of the work is 5,000*l.*, and the seating accommodation is for 650 people.

NEW CHURCH SCHOOLS, HESSLE.

The extensions to these schools are being erected by Mr. M. Harper, contractor, at an estimated cost of 1,500*l.* The extensions include three new classrooms, besides considerable internal alterations. The architect for the work is Mr. J. Bilson.

NEW BUILDINGS IN LONDON.

Laboratory buildings at University of London, Strand, W.C. (6,000*l.*); Professor F. M. Simpson, architect, 83, Gower-street, W.C. Block of office buildings, Aldwych, W.C.; Mr. A. Burr, architect, 85, Gower-street, W.C. Additions to offices of the City of London Board of Guardians; Mr. A. E. Pridmore, architect, 2, Broad-street Buildings, E.C.

NEW MILL, BELFAST.

Mr. Samuel Stevenson is the architect for the new spinning mill which is being erected for Messrs. Jaffe Brothers. The contractors are Messrs. M'Laughlin & Harvey, Ltd.

MONEYREA MASONIC HALL.

Messrs. Watt, Tulloch, & Fitzsimons are the architects for this new hall, the foundation-stone of which was laid last week. The contract is being carried out by Mr. W. J. M'Clurg.

WORTHING HOSPITAL.

The new outpatients' department of this hospital has been erected at a cost of 2,628*l.* from the designs of Mr. A. Morris Butler, architect. The contractor for the work is Mr. George Baker, jun., and the building will probably be opened in February.

TRADE NEWS.

Messrs. Hayward Brothers & Eckstein, Ltd., engineers and ironfounders, 187 to 201, Union-street, Borough, S.E., supplied sixteen large circular glazed terrace lights for lighting the rooms of the Museum below, in the King Victor Emanuel Memorial, Rome.

Under the direction of Mr. Arthur C. Bloomfield, M.A., Boyle's latest patent "air-pump" ventilators have been applied at the Bank of England, Threadneedle-street, E.C.

PROJECTED NEW BUILDINGS IN THE PROVINCES.*

ABERDEEN.—Church halls for Albion-street Congregational Church (22,000*l.*); Mr. R. G. Wilson, architect, 18a, Union-street, Aberdeen.

Alfreton.—Parish room (1,000*l.*); Vicar, St. Martin's Church, Alfreton.

Amesbury and Devizes. — Police-stations (6,775*l.*); Messrs. W. Parsons & Sons, builders, Westbury.

Ayr.—Byre accommodation and mart for Messrs R. Dewar & Sons (1,000*l.*); Mr. J. Young, Surveyor, Ayr Town Council.

Barton.—Addition to boys' school (370*l.*); Mr. G. F. Quinton, builder, 1, Carisbrook-road, Newport, I.O.W.

Blyth.—Forty houses; Mr. R. Grieves, Surveyor, Blyth Urban District Council.

Boathen (Stoke).—School (7,000*l.*); Mr. B. R. Ashworth, Town Hall, Hanley.

Bridlington.—Sunday-school; Rev. J. E. Evans, pastor, Trinity Congregational Church, Bridlington.

Bristol.—Laundry depôt for Bristol Co-operative Society; Mr. Ashley, manager, Building Department, Co-operative Society, Bristol.

Brixham (near Paignton).—School; Mr. P. Morris, architect, 1, Richmond-road, Exeter.

Brownhills.—Enlargement and improvement of Walsall Wood School (1,990*l.*); Messrs. H. Gough & Son, builders, 530, Dudley-road, Wolverhampton.

Cadishead (Manchester).—Thirty-one houses off Albert-street; Messrs. Brew Bros., builders, 3, Moss-lane, Cadishead, Manchester.

Cardiff.—Technical institute, Cathays Park (36,000*l.*); Messrs. Ivor Jones & Percy Thomas, architects, 18, St. Mary-street, Cardiff.

Castledykes.—School (400 places); Mr. S. M. Grant, Secretary, Education Committee, Lindsey County Council, Lincoln.

Cold Norton (Essex).—School (4,000*l.*); Mr. Frank Whitmore, architect, 73, Duke-street, Chelmsford.

Darlington.—Schools, Hollyhurst and Houghton roads; Mr. G. Winter, Surveyor, Town Hall, Darlington.

Darwen.—Kiosk and villa, Darwen Park (2,100*l.*); Mr. J. S. Seville, Council Offices, Darwen.

Dearnley (Rochdale).—Extensions to St. Andrew's Church (3,000*l.*); Mr. F. B. Oakley, architect, 5, Cross-street, Manchester.

Denbigh.—Block of public offices (7,000*l.*); Messrs. Parker & Elcock, architects, Estate Offices, Colwyn Bay.

Dewsbury.—Warehouse and offices (1,700*l.*); Messrs. Holtom & Fox, architects, 7, Corporation-street, Dewsbury.

Doncaster.—Lecture hall, etc.; Mr. C. Stevenson, architect, 6, St. Vincent-avenue, Doncaster.

Durham.—Chapel; Messrs. T. & S. Pott & Son, architects, 37, John-street, Sunderland.

Eastbourne. — Methodist Church (2,500*l.*); Messrs. Geo. Baines & Son, architects, 5, Clement's Inn, W.C.

Edinburgh.—Shelter at the Cattle Market (3,950*l.*); Mr. J. Walker Smith, engineer, Edinburgh Town Council.

Eltham.—Catholic Church; Mr. F. J. Bradford King, builder, Richard-road, Leicester.

Evesham.—Sixty houses, Broadway; Messrs. Dicks & Waldron, architects, Evesham.

Exeter.—Business premises, Sidwell-street; Mr. T. A. Lucas, architect, Guildhall-chambers, Exeter. Additions, St. John's School; Mr. Edgar Ware, architect, Bedford-circus, Exeter.

Exmouth.—Church institute (3,000*l.*); Mr. G. H. Fellowes-Prynne, architect, 6, Queen Anne's-gate, S.W.

Ferryhill.—School (6,500*l.*); Mr. J. A. C. Allan, architect, 5, Union-terrace, Aberdeen.

Glasgow.—Extensions and additions to premises, Hannay-street, for the Steel Company

* See also our list of Competitions, Contracts, etc., on another page.

of Scotland, Ltd., 23, Exchange-square, Glasgow. Extensions to Anchor Chemical Works, Portanmill, for Messrs. Alexr. Hope, Ltd. (2,150*l.*); Mr. A. W. McDonald, 219, Hope-street, Glasgow. Picture theatre, Smith-street (3,000*l.*); Mr. A. V. Gardner, architect, 164, Bath-street, Glasgow.

Glyn (Neath).—Schools; Mr. W. R. Nash, architect, Angel-street, Neath.

Great Harwood.—Extensions to works, Globe-street, for Messrs. F. Westby & Sons.

Greenock.—Baths and washhouses (5,000*l.*); Mr. F. Low, Burgh-buildings, Greenock.

Grimsby.—Paper mill for Messrs. P. Dixon & Son, Oughty Bridge, Sheffield.

Haggerston Beal (Northumberland).—Rebuilding, Haggerston Castle; Mr. A. Cayley, Estate Offices, Haggerston Beal.

Haslingden (Manchester).—Catholic School (3,000*l.*); Mr. H. Fielding, architect, 2, Beaconsfield-street, Haslingden.

Haywards Heath.—Alterations and additions to school (1,670*l.*); Mr. H. J. Bessant, builder, Eastbourne.

Honiton (Devon).—Additions to workhouse; Mr. Redfern, architect, Honiton.

Huddersfield,—Yeomanry headquarters, Fitzwilliam-street; Mr. W. Cooper, architect, 41, Kirkgate, Huddersfield.

Hutton.—Proposed hostel, dairy, and farm buildings, etc. (10,000*l.*); Mr. W. H. Schofield, Surveyor, Lancashire County Council, County Offices, Preston.

Hyde.—Extensions to rubber works for Messrs. Redfern.

Inverness.—Science and art school for Royal Academy (6,000*l.*); Mr. R. I. McBeth, Queen's House, Inverness.

Keighley.—Trade school (10,000*l.*); Mr. J. Stuart, architect, County Hall, Wakefield.

Kilbowie.—Extensions to sawmills (3,500*l.*); Building Department, Singer Manufacturing Company, Kilbowie.

Laira (Plymouth).—St. Mary's Church; Mr. T. R. Kitsill, architect, 1, George-street, Plymouth.

Lakenham.—School; Mr. C. J. Brown, architect, Cathedral Offices, The Close, Norwich.

Leeds.—Extensions to Notre Dame College; Mr. E. Simpson, 12, Cunliffe-terrace, Manningham, Bradford.

Lerwick.—Extensions to Gilbert Bain's Memorial Hospital (2,000*l.*); Mr. George Cruikshank, builder, Town Buildings, Lerwick.

Limerick.—Additions, infirmary (2,500*l.*); Mr. W. Rosengrove, architect, 33, Catherine-street, Limerick.

Llanystrimdswry.—Public institute (3,000*l.*); Mr. T. T. Rees, architect, Hamilton-street, Birkenhead.

Longbridge (near Northfield).—Catholic home of refuge (13,000*l.*); Messrs. Pugin & Pugin, architects, 51, North John Street, Liverpool.

Mitcham (Upper).—School (4,675*l.*); Messrs. Grace & Marsh, builders, 79, Tamworth-road, Croydon.

Mullanozan (Ireland).—Church; Mr. F. F. McNamara, architect, Great Brunswick-street, Dublin.

Neston.—Special subjects centre (1,135*l.*); Messrs. W. Fleming & Son, builders, Neston.

Newcastle-on-Tyne.—School, Welbeck-road (250 places); Mr. A. C. Coffin, Secretary, Education Committee, Newcastle-on-Tyne Town Council.

Newport (Mon.).—Church; Messrs. Habershon & Fawckner, Queen's-chambers, Newport, Mon.

Newsham.—Picture hall: Mr. J. N. T. Atkin, 1, St. Nicholas Buildings, Newcastle.

Newton.—Additions to Rexine Works for the British Leather Cloth Company.

Newton Bank.—Additions to print works for the Calico Printers' Association.

Normanton.—Public baths and washhouses (4,000*l.*); Mr. A. Hartley, Surveyor, Urban District Council Offices, Normanton.

Norwich.—Extensions to Willow-lane Schools (5,000*l.*); Mr. C. J. Brown, architect, Cathedral-chambers, The Close, Norwich.

Oxford.—School (7,000*l.*); Mr. A. Castle, City Estate Offices, City Hall, Oxford.

Pentrillyncymer and Glanconwy.—Schools; Mr. W. D. Wiles, Market-street, Wrexham.

Penzance.—Pavilion and winter gardens (4,000*l.*); Mr. H. Cowell, architect, Central-chambers, Newquay, Cornwall.

Petersfield.—Rectory (1,900*l.*); Vicar, St. Peter's Church, Petersfield.

Ponteland.—Children's home; Mr. C. S. Shortt, Clerk, Castle Ward Board of Guardians, Newcastle-on-Tyne.

Portslade.—Church; Messrs. Packham Brothers, builders, Preston Park, Brighton.

Port Sunlight.—Schools; Mr. H. Beswick, County Architect, Newgate-street, Chester.

Randolph Hill, N.B.—Villa (3,000*l.*); Mr. C. Simpson, architect, 16, King-street, Stirling.

Renfrew.—Extensions and alterations, Municipal Buildings (3,000*l.*); Mr. John Arthur, architect, 131, West Regent-street, Glasgow.

Rochdale.—Alterations to Lower-place United Methodist Church (700*l.*); the Trustees.

Rushden.—Factory, Allen-road, for Messrs. R. & S. Robinson; additions to factory, Newton-road, for Messrs. Ashford & Campion.

Seaham Harbour (Durham).—School (6,000*l.*); Mr. W. B. Cooper, builder, Sans-street South, Sunderland.

Sherburn Hill (Durham).—School (7,000*l.*); Messrs. Makepeace & Valks, builders, Trimdon, Durham.

Skegness (Lincs).—Cottage hospital (3,000*l.*); Mr. F. J. Parkinson, architect, 9, Richmond-terrace, Blackburn.

Spread Eagle (Oswaldtwistle).—School (4,000*l.*); Mr. H. Littler, 16, Ribblesdale-place, Preston.

Station Town (Durham).—School; Mr. W. Rushworth, architect, Shire Hall, Durham.

Stoke-on-Trent.—School (340 places); Mr. A. R. Wood & Sons, architects, Burslem.

Stourfield (Bournemouth).—School (4,000*l.*); Mr. F. W. Lacey, Surveyor, Municipal Buildings, Bournemouth.

Swansea.—Alterations to block at fever hospital (3,300*l.*); Mr. George Bell, Surveyor, Swansea Town Council.

Throston.—School (5,000*l.*); Mr. Proctor, 29, Church-street, Hartlepool.

Trowbridge.—School (5,000*l.*); Mr. J. G. Powell, architect, County Hall, Trowbridge.

Tunstall.—Extensions to Meakin's factory (6,000*l.*); Mr. J. C. Cowlishaw, architect, Stafford-street, Hanley; Mr. T. Godwin, builder, Victoria-road, Hanley.

Tyne Dock.—Picture hall (2,500*l.*); Mr. H. Grieves, architect, The Croft, Westoe, South Shields.

Tynemouth.—Market buildings (2,000*l.*); Mr. T. F. Smillee, Surveyor, Tynemouth Town Council.

Walkden.—Additions to mills for Messrs. E. Lane & Sons, cotton goods manufacturers, Hope Mills, Walkden.

Warrington.—Extensions to factory of Messrs. J. Fairclough & Sons (3,000*l.*); Messrs. W. & S. Owen, architects, Cairo-street, Warrington.

Wellington (Stoke).—Additions to school; Mr. B. R. Ashworth, Town Hall, Hanley.

Wheatley Hill (Durham).—School; also additions to school at Ford; Messrs. Clery & Charlton, builders, Sunderland.

Willington.—Enlargement of isolation hospital; Mr. J. H. Gardner, Surveyor, Willington Urban District Council.

Witham.—Enlargement of hospital (1,000*l.*); Mr. T. R. Swales, Surveyor, Maldon Town Council.

Woodhouse (Sheffield).—School and buildings (5,212*l.*); Mr. J. B. Abbey, architect, 34A, New Market, Huddersfield; Messrs. Mark Brook & Co., builders, Huddersfield.

Woodseats (Sheffield).—Church; Messrs. Geo. Baines & Son, architects, 5, Clement's Inn, W.C.

Wortley (Leeds).—Factory and laundry; Mr. F. D. McKay, architect, The Lodge, Bramley, Yorks.

Yeadon.—School; Vicar, Parish Church, Yeadon.

Yeovil.—Fifty houses; Mr. A. Oddy, Surveyor, Yeovil Town Council.

FOREIGN AND COLONIAL.

Labour in the Colonies.

From the Supplement to Circulars of Emigrants' Information Office, 34, Broadway, Westminster, S.W., we take the following:—

New South Wales.—In Sydney and suburbs the building and iron trades and factory workers have been well employed, and stonemasons, bricklayers, plasterers, carpenters, joiners, able-bodied labourers, are in great demand. The strike of iron workers at Lithgow continues.—In *Victoria* employment continues to be very good, and assisted passages are now being granted to mechanics. There is a large demand for bricklayers, carpenters, plasterers, boilermakers, blacksmiths, moulders, engine fitters, plumbers, turners, and furniture makers. *South Australia.*—Work of nearly all kinds is plentiful, and there is a good demand for bricklayers, masons, plasterers, carpenters, first-class painters, plumbers, boilermakers, ironworkers, moulders, and coppersmiths. *Queensland.*—There is a good demand for labour generally, both in towns and country. *New Zealand.*—The demand for mechanics is not general, but skilled men, such as plumbers, have little difficulty in finding work. *Union of South Africa.*—Employment in the building trades in Johannesburg continues brisk. In Pretoria the state of trade is fair in building, shops, and farming. In the Orange Free State a demand for builders exists at Bethlehem. In *The Cape* there are openings at Cape Town for a few masons in the stone-dressing industry. *Panama Canal.*—The employment by the Isthmian Canal Commission of skilled labourers is now restricted to American citizens, except in cases in which American labour of the character required is not available. There is a surplus of skilled and unskilled labour on the Isthmus, and as the Canal Works are now within measurable time of being completed it will soon be necessary to reduce the number of men employed.

Labour in Cape Town.

We take the following from the Government Labour Bureau, Cape Town, for the month of October:—

Stone-dressing.—Very busy. Seventy-seven masons are employed at the new Law Courts and about twenty-five others in connexion with other undertakings in various parts of the town.

Plumbing.—Much brighter. The greater portion of the work in progress is in connexion with repairs, but a few contracts for new work are now being dealt with, and it is quite possible that a slight shortage of men may occur in the near future.

Painting and Decorating.—Improving. There is an increase in the number of premises in course of redecoration, and only three painters were registered for employment at the Bureau.

Fibroplaster and Cement Working.—Fair, but with no increase in the demand for labour.

Bricklaying.—This trade now shows signs of a definite improvement, and employment is more readily obtainable than at any time during the past six months.

Shopfitting.—As anticipated in September, an increase has occurred in the amount of work in hand.

Joinery and Woodworking Trades.—This industry has improved to a considerable extent since September. Applications by competent joiners to fill prospective vacancies should be made personally at the Labour Bureau or through the medium of the magistrate in whose district the applicant resides.

Furniture Manufacture and Cabinet-making.—Very busy.

Building Work, Ceylon.

The Principal Collector of Customs of Ceylon (Mr. C. D. Vigors), in his report for the year ended June 30, 1911, states that proposals are before the Government for the erection of export warehouses at Colombo on the old coaling grounds, and also for the provision of a steam or petrol launch for Customs use in the harbour. It has been decided to obtain an electric crane for loading material into trucks, and also an additional crane for Government goods. The passenger jetty at the port is to be lengthened by 120 ft. A scheme is being prepared for the deepening of Colombo harbour, a large part of which has a depth of less than 30 ft. This work will be necessary if the Suez Canal is deepened to 36 ft. by 1914.

Hospital, Freetown, Sierra Leone.

The Sierra Leone *Royal Gazette* of November 11 contains the text of the Governor's address on the introduction of the annual estimates, from which it appears that a new hospital is to be built at Freetown.

Building and Road-making, etc., Works, Argentine Republic.

The *Boletin Oficial* of November 10 publishes a decree (No. 8,573), issued by the Ministry of Public Works, earmarking a sum of 20,846,000 pesos currency (about 182,500*l.*) for the carrying out of extensive public works throughout the Republic. Of this sum 1,390,000 pesos (about 121,600*l.*) is allocated to Buenos Aires City, and a similar sum to each of the following provinces:—Buenos Aires, Santa Fé, Cordoba, Entre Rios, Corrientes, San Luis, Jujuy, San Juan, Santiago del Estero, Mendoza, Salta, Tucuman, Rioja; and 1,386,000 pesos to Catamarca. The principal works to be carried out consist of the building and enlarging of schools, colleges, hospitals, and libraries; the making of roads; dredging, irrigation, and canal works; and bridge building.

Theatre at Yurieff, Russia.

H.M. Consul at Riga (Mr. V. H. C. Bosanquet) reports that, according to the local Press, a project is on foot to construct a stone theatre at Yurieff (Dorpat), in the province of Livonia. A sum of 110,000 roubles (about 11,600*l.*) is required for the enterprise.

School Houses, Cuba.

The *Gaceta Oficial* publishes a law earmarking a sum of 150,000 pesos (about 31,000*l.*) for the erection of 150 new school houses in various parts of the Republic.

LEGAL COLUMN.

Water Charges.

Another conundrum has come up for decision by the Courts under the Metropolitan Water Board (Charges) Act, 1907, in the case Metropolitan Water Board *v.* Phillips, the question being what was the rateable value of certain premises upon which the water rate was to be calculated.

The premises in question were the Brown Bear, Aldersgate. The claim of the Water Board related to two quarters, viz., October 1 to December 31, 1910, and January 1 to March 31, 1911. By a supplementary list, which came into force April 6, 1909, the rateable value had been assessed at 400*l*., but on June 2, 1910, the overseers had sent to the Assessment Committee a provisional list, placing the value at 399*l*. On objection the Assessment Committee reduced the rateable value to 234*l*. and that list was dated October 3, 1910, and came into force on that day.

The defendants contended that the water rate should be based for both quarters on this lower valuation, but the Water Board claimed 5*l*., being 5 per cent. on 400*l*., the former assessment for the first of the two quarters and 5 per cent. on the lower assessment for the second of the two quarters' water rate.

The Court decided the question in favour of the Water Board, but agreed that the case involved difficult questions, and that the decision imposed some hardship on the defendant. Very shortly stated, the reasoning of the decision was as follows:—Sect. 13, sub-sect. 1, of the Metropolitan Water Board (Charges) Act, 1907, provides that the rateable value "shall be determined by the valuation list in force at the commencement of the quarter for which the water rate accrues. . . ." This Act incorporates the Waterworks Clauses Act, 1847, sect. 70 of which made the water rates payable in advance on the ordinary quarter days, but the Charges Act, by sect. 15, makes the quarterly dates of payment April 1, July 1, October 1, and January 1. After a careful examination of the various Acts relating to valuation the Court came to the conclusion that under sect. 13 of the Charges Act the list in force at the commencement of the quarter for which the water rate accrued was the original list, placing the rateable value at 400*l*., the provisional list not being in force until after the objection had been heard and determined by the Assessment Committee, which, it will be seen in this case, was October 3, or three days after, under the Charges Act, the water rate accrued became due.

The Act which regulates the supply of water by the Metropolitan Water Board is a private Act, and therefore the public have less facilities for becoming acquainted with its provisions than is the case with public statutes, yet it has altered and modified many public statutes and has been the cause of considerable ligitation which has involved questions the Courts have expressed difficulty in solving. With reference to the changes of dates in the quarter days upon which the rates are payable we may remind our readers of a decision reported the *Builder*, September 5, 1908, in which it was held that the Water Board were under no statutory obligation to give any notice to consumers.

LONDON COUNCILS.

Barking.—Application is to be made to the Local Government Board for sanction to a loan of 505*l*., the estimated cost of widening Ripple-road, between Cobham-road and Westbury-road. The plans of the Architect for the erection of four cottages on a portion of the hospital site have been referred to a sub-committee for consideration and report.

Battersea.—Repairs with granite macadam are to be carried out in six roads at an estimated cost of 618*l*. Electricity mains are to be extended at an estimated cost of 107*l*. No objection is to be raised to the proposals of Mr. L. A. Wilde to erect a new chapel on the site of the old chapel at the Salesian Schools, Surrey-lane, and of Messrs. Edwin Evans & Sons, for six houses in Sudbrooke-road.

Camberwell.—Alterations are to be carried out to the Camberwell Baths, Church-street, to comply with the conditions of the London County Council, at an estimated cost of 1,100*l*.

County of London.—A meeting of Metropolitan Borough Engineers has been held to consider the following letter from Mr. W. E. Riley, Superintending Architect to the London County Council:—"The Building Acts Committee of the Council has had under further consideration the question as to an arrangement being agreed between the Council and the Metropolitan Borough Councils with regard to buildings and structures to be dealt with by the respective authorities under Part VII. of the London Building Act, 1894. Experience since the subject was last discussed has confirmed the Committee in the opinion that it would be to the public advantage if an arrangement could be arrived at to define which buildings and structures could be dealt with by the Council and Borough Councils. I am, therefore, authorised by the Committee to inquire whether you would be prepared to recommend your Council to agree to an arrangement under which your Council would deal, under sect. 84 of the London Building Act, 1894, with buildings within the following limits, buildings not complying with these conditions being dealt with by this Council:—Summer-houses, tool sheds, coals or wood sheds, fowl houses, and runs, pigeon houses, dog kennels, perambulator sheds, cycle sheds, motor-car sheds, and other similar structures—(a) Not exceeding in area 64 sq. ft.; (b) Not exceeding in height 7 ft. in any part measured from the level of the ground to the underside of the eaves or roof-plate; (c) Distant at least 5 ft.: (1) from any street; (2) from any other building or structure, unless there be a non-perforated wall separating the proposed structure for the whole of its length and height from such other building or structure; (d) Not having therein any stove, flue, fireplace, hot-air pipe, hot-water pipe, or other apparatus for warming or ventilating the same; (e) Not extending in an part thereof within the prescribed distance from the centre of the roadway of any street or way; and (f) Not projecting in any part thereof beyond the general line of buildings in any street or way." The following resolutions were agreed to at the conference:—(a) That with reference to Mr. Riley's letter of the 11th inst., after carefully considering, in conference, the suggestion of the Superintending Architect, the Metropolitan Borough Surveyors are not prepared to acquiesce in Mr. Riley's proposals. (b) That this conference would willingly take into consideration some alternative scheme for equitable distribution of the statutory duties of Part VII. of the London Building Act, 1894.

Deptford.—The Public Health Committee have put forward the following recommendations at the conclusion of their report on infantile mortality:—(1) That the Baths and Washhouses Committee consider the desirability of converting two or more houses in one of the wards in the central district of the borough as slipper baths; (2) That the Works Committee take into consideration the paving of streets in congested areas with a surface of jointless and impervious material. Plans have been passed for Mr. R. J. Adams for additions to a building at the rear of Nos. 41-3, Clifton-hill, and for the erection of a building at the rear of Nos. 45-7, Clifton-hill.

Kensington.—The kerb and footway paving in portions of Ossington-street, Pembridge-road, High-street, Notting Hill-gate, Ladbroke-road, and Cornwall-road are to relaid and made good where necessary at a total estimated cost of 272*l*. The tender of Messrs. A. Roberts & Co., Ltd., at 126*l*., has been accepted for carrying out alterations and other works in adapting No. 21, Drayson-mews for use as a tool-house, store, etc. The Works Committee report that in connexion with a report submitted to the Council in October last on the subject of the advisability of a scheme being adopted providing for street name tablets in London being of a uniform character, they stated that they had had before them a suggestion that it might be of considerable assistance to pedestrians if the names of streets were also let in the paving of the footways at street corners, particularly in more important thoroughfares. They had had before them a footway tablet in mosaic which had been prepared by the directions of the Borough Engineer, and he suggested that footway tablets of this material, which gives a good foothold, should be laid on each side of Kensington High-street, indicating that thoroughfare, in close proximity to the eastern and western boundaries of the street. As regards the proposal put forward, the Committee wish to point out that whilst tablets let in footways may be of some advantage to pedestrians, they would be found to be of little, if any, assistance to vehicular traffic, and looking to the number of pedestrians in busy thoroughfars, such as Kensington High-street, and to other conditions, they consider that plainly lettered street name tablets fixed on buildings and tablets fixed on lamps would be found more useful than footway tablets, particularly as the latter, if fixed in such thoroughfares, would very frequently be wholly or partially covered up by persons making use of the footways. The Committee have, therefore, given directions for special attention to be given to the fixing of name tablets at a lesser height upon buildings than has been the practice in the past, and to the fixing of a greater number of tablets on street lamps.

Lambeth.—The tenders of Messrs. Thomas Wood & Sons, Ltd., Messrs. Bristowe & Co., Ltd., and Messrs. Johnson Brothers have been accepted at 1,500*l*., 250*l*., and 250*l*. respectively for tar-spraying works during the year 1912-13. The following plans have been passed:—Mr. Walter Nightingale, on behalf of the Duchy of Cornwall, drainage of ten houses proposed to be erected in Aquinas-street, Stamford-street; Mr. J. Parsons, on behalf of the Duchy of Cornwall, drainage of twenty houses proposed to be erected in Denny-street; Messrs. Stringer Brothers, drainage of three houses proposed to be erected in Claverdale-road, Upper Tulse-hill.

Lewisham.—Tenders are to be invited for paving Phœbeth-street, Francemary-street, and a portion of George-lane, as soon as 75 per cent. of the estimated cost of the works have been received. A 16-ft. strip of pavement in front of 218-244, Brownhill-road is to be paved at an estimated cost of 95*l*. The tender of the Improved Wood Pavement Company, Ltd., has been accepted for laying wood-paving in Catford-road at the following costs:—340 yards super. wood-paving 9-in. concrete, 12*s*. 1½*d*. per super. yard; 70 yards super. wood-paving, 8*s*. 2*d*. per yard; 50 yards super. 12-in. concrete, 12*s*. 11½*d*. per yard. The footpaths on the north side of Rosenthal-road are to be repaired with artificial stone in lieu of tar-paving, at an estimated cost of 102*l*. The tender of Mr. G. J. Howick has been accepted for replastering the ceilings in the Central and Forest Hill Libraris in sirapite, at 37*l*. 17*s*. and 38*l*. 17*s*. 6*d*. respectively. The following plans have been passed:—Royal Arsenal Co-operative Society, Ltd., additions at rear of Nos. 50 and 52, Rushey-green; Mr. J. Randall Vining, shops, London-road; Mr. E. H. Harrison, five shops, Fernbrook-road; Mr. G. A. Lansdown, forming and laying-out street in continuation of Newstead-road, also new street out of St. Mildred's-road.

Middlesex County Council.—The City Engineer and Surveyor has been authorised to substitute Lancashire or Yorkshire grit stone setts for the existing granite setts over Cobham County Bridge, Yiewsley, at an estimated cost of 100*l*. A new carriageway of mild steel decking and wood blocks in lieu of the existing plank decking and macadam is to be constructed over the Middlesex half of Hampton Court County Bridge, at an estimated cost of 1,750*l*.

Poplar.—The electrolytic disinfectant shed is to be removed from the site adjoining the electricity works to the opposite side of Violet-road, where it is to be enlarged and reconstructed at an estimated cost of 240*l*., including the provision of concrete foundations, drainage, refixing apparatus, electric installation, etc. During the quarter to end March 31 next repairs are to be carried out to the wood-paving of five roads at an estimated cost of 1,800*l*.; the macadam paving of ten roads at an estimated cost of 662*l*.; and sett-paving of two roads at an estimated cost of 300*l*. The application has been approved of Mr. C. Dunch, on behalf of Messrs. Howard Brothers, for the erection of buildings in Portree-street.

St. Pancras.—The Council have decided to lease Oak House and Wellington House to Mr. Samuel Pulham, Victoria-parade, Muswell Hill. The tenant proposes to expend nearly 1,000*l*. on improving the property.

Shoreditch.—Laburnam-street is to be repaved with 2-in. compressed asphalt, and Union-walk with redressed granite setts, at an estimated cost of 2,115*l*. Electricity mains are to be extended in the Bethnal Green area at on estimated cost of 350*l*.

Southwark.—The tender of St. Pancras Ironworks Company, Ltd., has been accepted at 125*l*. for supplying and fixing stall divisions on the first-floor stables at Greenmoor Wharf. Plans submitted by Messrs. Henry Langston & Co., 1, 2, 3, and 30, The Exchange, Southwark-street, S.E., have been approved for the erection of a building on the site of Nos. 266-282, Waterloo-road.

Walthamstow.—The tender of the Trinidad Lake Asphalte Paving Company, Ltd., has been accepted for a supply of Trinidad asphalt macadam and bitumen, at 1*l*. 6*s*. per ton for the macadam and 5*l*. 5*s*. per ton for the pure natural Trinidad Lake bitumen (for grout). Plans are to be prepared by the Engineer for making-up the footpath in front of Nos. 113-149, Blackhorse-lane. Tenders are to be invited for carrying out the work of doubling the tramway track at the "Bell" corner in Forest-road. Plans have been passed for Messrs. F. H. Heath, Ltd., for an electric theatre in Wood-street. Mr. F. W. Willmott and Mr. F. Clayton have lodged plans for an electric theatre in Hoe-street, and three houses, Byron-road, respectively.

Willesden.—The work of repaving the pathways in Cavendish-road is to be proceeded with at an estimated cost of 830*l*. The tender

of Messrs. D. R. Paterson, Ltd., has been accepted for the construction of a sewer in Neasden-lane; as has also the tender of Mr. G. W. Riley, at 193*l.* 10*s.*, for the provision of a bandstand in Roundwood Park.

Wood Green.—The Surveyor is to be instructed to prepare plans and estimates of the cost of levelling and laying-out the land at the rear of the Town Hall. Tenders are to be invited for culverting, etc., a portion of Moselle Brook. A plan has been lodged by Mr. S. W. Cranfield for the conversion of a shop into a cinematograph hall, Myddleton-road, Bowes Park.

Woolwich.—Plans have been lodged with the London County Council by Mr. Bruce Dawson, 6, Old Queen-street, Westminster, S.W., for the erection of a new factory in Green-lane, North Woolwich.

OBITUARY.

Sir James C. Inglis, M.Inst.C.E.

Sir James Charles Inglis, member of the Council, 1907, and President, 1908 and 1909, of the Institution of Civil Engineers, and General Manager of the Great Western Railway Company, died at Rottingdean on December 19, aged sixty years. He was member of the Prussian Order of the Red Eagle (Third Class) and the Order of the Crown of Italy; a member of the Royal Commission upon Canals and Inland Navigation, and an arbitrator for the Federated Malay States Government in the matter of the purchase of the Tanjong Pagar Docks, Singapore, 1905. A native of Aberdeen, he received his earlier education in the Grammar School and University there; he entered Messrs. Norman, Copeland, & Co.'s engineering works in Glasgow, and then, 1872-5, was employed as James Abernethy's pupil upon the Alexandra railways and docks. Under Mr. P. J. Margary he worked upon the construction of the Great Western docks at Millbay, Plymouth, for the South Devon and Cornwall Railways. Having started in practice as a civil engineer at Plymouth, Sir James Inglis constructed Mount Batten breakwater for the Cattewater Harbour Commissioners, together with railway, harbour, and similar undertakings in South Devon and Cornwall. In 1892 he was appointed Assistant-Engineer, and within a few months Engineer-in-Chief to the Great Western Railway Company; in 1903 he became General Manager and Consulting Engineer, and thus was associated with their extension schemes for Fishguard Harbour, their South Wales lines, and the joint line with the Great Central to Wolverhampton and Birmingham. It is stated that he was the first student of the Institution of Civil Engineers and the first railway General Manager who became President of the Institution. The funeral took place on December 23 at Kensington Cemetery.

PATENTS.

APPLICATIONS PUBLISHED.*

27,633 of 1910.—Jean Jacques Pousset: Apparatus for the display of sectional building models.

27,805 of 1910.—Charles Ervin Reitz: Ventilators.

26,216 of 1910.—Thomas Downie: Furnace fronts and doors.

28,284 of 1910.—Henry William Hemingway: Process for preserving or treating stone and like building materials, and for producing cement.

1,008 of 1911.—Charles Clayton Shaw: Flushing apparatus.

1,560 of 1911.—John Thomas Henthorne: Joint for pipes or conduits.

3,153 of 1911.—Fedor Silber: Roofing tiles.

6,576 of 1911.—John Howard Cartland and Archibald Henry Collins: Apparatus for closing doors and the like.

9,938 of 1911.—Max Seyferth: Floor cleaning machines.

11,513 of 1911.—Isidor Garcia Lastra, Guillermo Bernstein and Cipriano Salvatierra: Manufacture of reinforced cement column.

12,092 of 1911.—Arthur Johnson: Means for moulding bricks, tiles, and similar articles.

12,836 of 1911.—Charles Back and Rudolf Wacik: Process and device for manufacturing marble slabs with inscriptions, ornamentations, and the like in imitation marble.

13,511 of 1911.—Henry Arthur Goddard: Box cores that are used in building hollow concrete walls.

16,506 of 1911.—George Baxter Upham: Processes for manufacturing bituminous paving blocks.

16,631 of 1911.—Robert Hudson: Fasteners suitable for windows, doors, gates, shutters, box-lids, and the like.

18,608 of 1911.—Paul Schwenzow: Machines for stamping plastic material into moulds in the manufacture of pipes, tubes, and like bodies.

18,856 of 1911. — Edouard Benedictus: Strengthened glass.

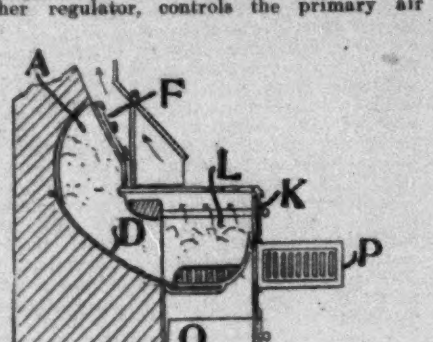
20,104 of 1911.—Frank Iliff: Chimney-pots or cowls.

22,135 of 1911.—Henri Marliere: Safety-chains for doors, windows, or the like.

SELECTED PATENTS.

19,313 of 1910.—Robert MacLaurin: Stoves.

This relates to a kitchen stove having a charging-hopper *A* with a gastight cover *F*, and a shoot *D*, at the rear of a cooking-range, and wherein the primary and secondary air supplies may be regulated by doors. The upper door *K*, and the ashpan *Q* are tight-fitting, and a door *P*, with a hit-and-miss or other regulator, controls the primary air



19,313 of 1910.

supply and also the secondary air supply, which passes from the ashpit through a hollow cheek. The bottom grate-bars may be curved up at the front without additional front bars, or front bars with a lifting bottom grate may be provided. Flues are provided beneath and above a side boiler *L*, and continue above or around the oven, a damper being provided to direct the hot gass.

18,250 of 1910.—Edward Charles Robert Marks (Soc. Anom. Beer, Belgium): Transporters.

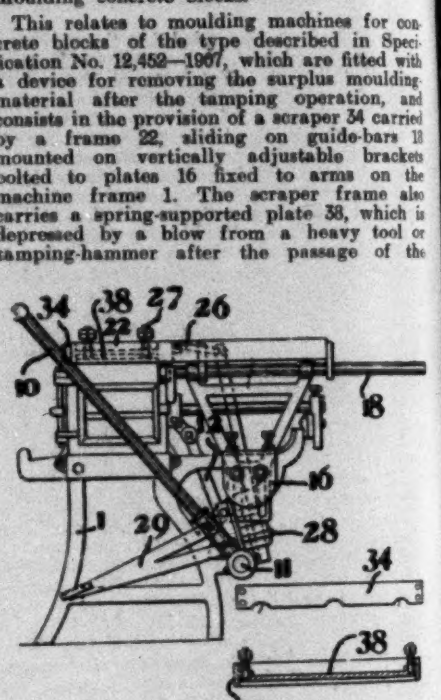
This relates to an apparatus for removing material from a heap which comprises a crane-like structure, from the crab of which depends a rigid frame carrying the shovel. In one arrangement the crab 4 is driven by a pinion engaging a rack 18 on the bridge 1, and carries a vertically-adjustable frame 5, at the lower end of which the shovel 7 is pivotally mounted at 6. The shovel is formed symmetrically so as to be capable of working in either direction, and is provided with small rollers 14 to run upon the ground. The shovel is swung about its axis by cords operated from a winding machine controlled from the driver's cabin. In the other arrangement the shovel has only one cutting-face, and one side of the frame 5 is extended downwards, at 15, to form an abutment for the frame 5. The shovel is discharged over the rear edge down a shoot 16 leading to a hopper.

18,142 of 1910.—William Larmer: Chimney-tops.

This relates to a chimney-top which consists of an inner tube, having its bore equal in diameter to the chimney opening, with a canopy over, and an outer tube, which is of about twice the height of the inner tube, and is formed at its base as a chamber of four or more sides, in which are air-holes.

18,929 of 1910.—Edward Charles Robert Marks (Ideal Machinery Company, U.S.A.): Moulding concrete blocks.

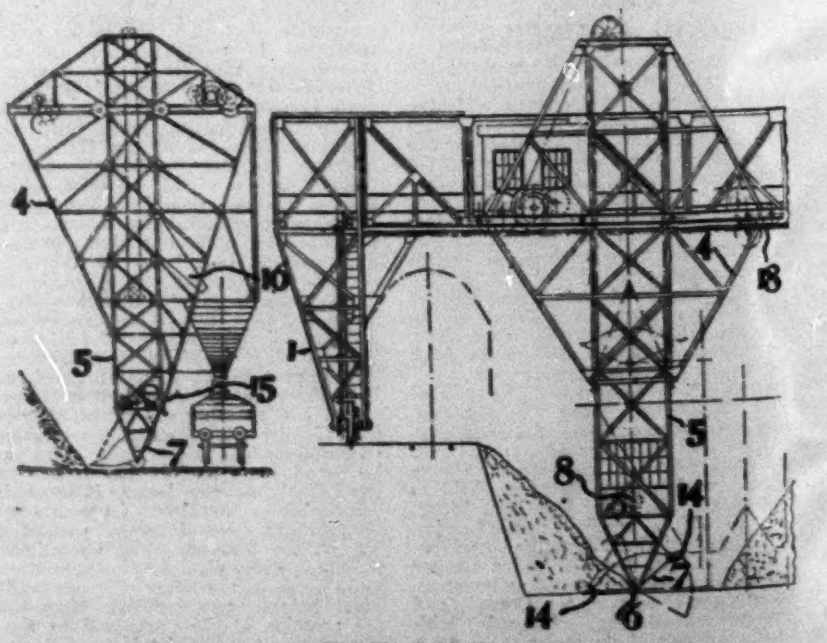
This relates to moulding machines for concrete blocks of the type described in Specification No. 12,452—1907, which are fitted with a device for removing the surplus moulding-material after the tamping operation, and consists in the provision of a scraper 34 carried by a frame 22, sliding on guide-bars 18 mounted on vertically adjustable brackets bolted to plates 16 fixed to arms on the machine frame 1. The scraper frame also carries a spring-supported plate 38, which is depressed by a blow from a heavy tool or tamping-hammer after the passage of the



18,929 of 1910.

scraper to smooth and flatten the upper surface of the block. The forward movement of the scraper frame is effected by a foot-lever 29 fixed to a yoke 28, which is revolubly mounted on the shaft 11 of the core-actuating yoke 12, and operates through a lever 27 and link 26. The return movement is effected by the engagement of the yoke 12 with the lever 27 when the lever 10 is operated to withdraw the cores.

SELECTED PATENTS—*Continued on page 790.*



18,250 of 1910.

*All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. **Those with an asterisk (*) are advertised in this number:** Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointment, xvi.; Auction Sales, xx.

Certain conditions beyond those given in the following information are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements; and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.

Competitions.

DECEMBER 29. — **Glasgow.** — DESIGN FOR A BRIDGE.—Designs are invited (Alexander Thomson Travelling Studentship) for a bridge. Premiums of 60*l.* and 20*l.* are offered. See advertisement in issue of December 24, 1910, for further particulars.

DECEMBER 30. — **Armadale.** — Public hall and offices, to cost 2,500*l.* Premiums of 15*l.* and 10*l.* Open only to architects who were represented on the site on October 12.

DECEMBER 30.—**Hastings.**—EAST SUSSEX HOSPITAL.—Premiums of 125*l.*, 75*l.*, and 50*l.* Mr. E. T. Hall, F.R.I.B.A., Assessor.

DECEMBER 30.—**Welsh Eisteddfod, 1912.**—DESIGNS FOR WORKMEN'S DWELLINGS.—Prize, 50*l.* Particulars from Welsh Housing Association, 9, Temple-chambers, E.C.

JANUARY 1, 1912. — **Rochdale Infirmary.**—EXTENSIONS.—Limited to Rochdale architects. Assessor, Mr. Alex. Graham, F.R.I.B.A.

JANUARY 6. — **Bolton.** — Miners' Federation Hall and Offices. Limited to architects within twenty-five miles of Bolton. Premiums, 50*l.* and 25*l.* Assessor, Mr. Jonathan Simpson, F.R.I.B.A. Particulars from Messrs. Fielding & Fernihough, 7, Fold-street, Bolton.

JANUARY 6. — **Stafford.** — PUBLIC LIBRARY.—The Stafford Corporation invite designs for a Public Library. Mr. Henry T. Hare, F.R.I.B.A., assessor. Second and third premiums of twenty and forty guineas. Deposit, 1*l.* Particulars from Mr. W. Plant, A.M.Inst.C.E.

JANUARY 8.—**Banbury.**—WORKMEN'S DWELLINGS.—The Banbury T.C. invite designs for workmen's dwellings. See advertisement in issue of December 8 for further particulars.

JANUARY 9.—**Magherafelt.**—TECHNICAL SCHOOL.—Particulars from Mr. W. D. Cousins, County Technical Office, Court-house, Coleraine.

JANUARY 9. — **Spennymoor.** — PUBLIC HALL, ETC.—The Spennymoor U.D.C. invite competitive plans and designs for a public hall, market, and offices, etc. Three premiums are offered. See advertisement in issue of December 1 for further particulars.

JANUARY 28.—**Buzau, Roumania.**—TRAINING COLLEGE (16,000*l.*).—Premiums 200*l.*, 40*l.*, 20*l.* Particulars from the Ministère des Cultes et de l'Instruction Publique, Bucharest.

JANUARY 29. — **Montevideo.** — Government palace (premiums, 2,125*l.* and 850*l.*) and town improvement scheme (premiums, 1,060*l.*, 640*l.*, and 425*l.*). Conditions may be seen at the Board of Trade, 73, Basinghall-street, E.C.

JANUARY 31. — **Australia.** — DESIGNS FOR FEDERAL CAPITAL CITY.—The Government of the Commonwealth of Australia invite competitive designs for the laying out of this Federal capital city. See advertisement in issue of September 1 for further particulars. See also page 505, November 3.

FEBRUARY 8.—**Bolton.**—NURSES' HOME AT THE INFIRMARY.—Premiums of 30*l.*, 20*l.*, and 10*l.* Assessor, Mr. John B. Gass, F.R.I.B.A.

FEBRUARY 17.—**London, E.C.**—NEW OFFICES.—The Port of London Authority invite preliminary sketch designs for new head offices in Trinity-square, and for laying out remainder of land as a building site. See advertisement in issue of November 24 for further particulars.

MARCH 15. — **Drammen, Norway.**—RAILWAY-STATION.—Particulars from the Norges Statsbaner, Christiania.

* MARCH 15.—**Prestatyn, North Wales.**—LAYING-OUT ESTATE.—Lord Aberconway and the Trustees of the Prestatyn Estate invite designs for laying-out of the estate. Three premiums are offered. See advertisement in this issue for further particulars.

* MARCH 16.—**Harrow.**—PUBLIC OFFICES.—The Harrow-on-the-Hill U.D.C. invite tenders for the enlargement of and alterations to their Public Offices. See advertisement in this issue for further particulars.

MAY 1.—Society of Architects' Travelling Studentship. Design for a Town Hall. 25*l.* and medal.

JULY 1. — **Dusseldorf.** — A plan for the extension of the City of Dusseldorf. Premiums of 1,000*l.* to 375*l.* Conditions on application to the Chief Burgomaster, Dusseldorf. A translation appeared on page 365, September 29.

NO DATE.—**Jordanhill, Glasgow.**—PROPOSED TRAINING COLLEGE.—Limited to six firms, named in Competition News, December 1, page 635.

NO DATE. — **Winnipeg.** — PARLIAMENT BUILDINGS.—Conditions from the High Commissioner for Canada, 17, Victoria-street, S.W.

Contracts.

BUILDING.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

DECEMBER 30. — **Bradford.**—ALTERATIONS.—For alterations to classrooms and erection of new conveniences at the Ryan-street School. Drawings and general conditions of contract seen, and quantities from the City Architect, Town Hall, Bradford.

DECEMBER 30.—**Partown.**—PAVILION.—Erection of bowling pavilion at the H.C. and A.C. ground. Mr. R. W. Yates, architect and surveyor, 32, John William-street, Huddersfield.

DECEMBER 31.—**Bradford.**—WAREHOUSE.—Erection of a warehouse at North Wing, Bradford. Mr. Wm. Illingworth, architect, 9, Market-street, Bradford.

JANUARY 1, 1912.—**Dundalk.**—HOTEL.—Erection of a new wing to the Carlingford Hotel. Mr. J. F. M'Gahon, architect, 9, Exchange-buildings, Dundalk.

JANUARY 2. — **Merthyr Tydfil.**—ROOM.—Erection of manual instruction room at Abermorlais School. Particulars from the Deputy-Surveyor, Town Hall.

JANUARY 3. — **Huddersfield.**—CLUB.—Erection of a Liberal Club at Almondbury, Huddersfield. Plans seen, and quantities from Messrs. Stocks & Sykes, architects, St. Peter's-street, Huddersfield.

JANUARY 3.—**Seven Sisters.**—VICARAGE.—Erection of a vicarage. Plans and specification seen, and quantities from Mr. J. Cook Rees, M.S.A., Parade-chambers, Neath.

JANUARY 4. — **Derby.** — OFFICES.—The Midland Railway Company invite tenders for the erection of additional offices for Telegraph Superintendent at Derby. Plans and specifications seen, and quantities and particulars from the Engineer, Derby Station.

JANUARY 4. — **London.** — EXTENSION.—For the extension of Hampstead Sorting Office. Drawings, specification, and conditions and form of contract with Mr. J. Rutherford, 22, Carlisle-place, London, S.W. Quantities and forms of tender at H.M. Office of Works, etc., Storey's-gate, S.W., on deposit of 1*l.* 1s

* JANUARY 4. — **Netherton.** — SCHOOL. — The Dudley B.C. invite tenders for the erection of a new junior and infants' school to accommodate 460. See advertisement in this issue for further particulars.

JANUARY 4.—**Redruth.**—CHURCH.—Erection of Wesleyan church at Wheal Buller, near Redruth. Plans and specification with Mr. S. Hill, architect, Green-lane, Redruth.

JANUARY 6. — **Alford.** — HOUSE.—Erection of a house in Station-road. Quantities and forms of tender from Mr. Frederick Parker, F.S.A., architect, Boston. Deposit of 1*l.* 1s.

JANUARY 6.—**Frampton.**—VICARAGE.—Erection of a vicarage house. Plans and specifications with Mr. C. N. Tunnard, 16, Wide Bargate, Boston.

JANUARY 6.—**Landore.**—ADDITIONS.—For additions to Salim schoolroom. Architects, Messrs. Richard & Matthews, Salubrious-place, Swansea.

JANUARY 6. — **Treneere.**—SCHOOL.—Erection of a county school for girls at Treneere, Penzance. Plans and specification with Mr. O. R. Caldwell, architect, Penzance, or Mr. Sampson Hill, Architect to the Committee, Green-lane, Redruth.

JANUARY 8.—**Bryn Ithel.**—HOUSE.—Erection of a detached house at Bryn Ithel, Aberbeeg. Plans and specifications with Messrs. Seaborne & Cayley, architects and surveyors, Hengoed.

JANUARY 8. — **Bryn Ithel.**—HOUSES.—Erection of two houses in Bryn Ithel, Aberbeeg. Plans and specifications from Messrs. Seaborne & Cayley, architects and surveyors, Hengoed.

* JANUARY 8. — **London, N.W.** — KIOSK.—The Commissioners of H.M. Works and Public Buildings invite tenders for a kiosk at Primrose Hill, Regent's Park, N.W. See advertisement in this issue for further particulars.

JANUARY 8. — **Richmond.** — ADDITIONS.—For alterations and additions to police-station, Victoria-road, Richmond. Plan and specification at the police-station, and tenders to Mr. F. W. Hall, Olliver, Richmond, Yorks.

* JANUARY 10.—**Hammersmith.**—ALTERATIONS, ETC.—The Hammersmith B.C. invite tenders for alterations and repairs to premises, No. 120, King-street. See advertisement in this issue for further particulars.

JANUARY 11. — **Caterham.** — SCHOOL.—Erection of Roman Catholic school. Mr. W. Bevan, F.R.I.B.A., architect, 85, Lansdowne-road, Croydon. Quantities on deposit of 1*l.*

* JANUARY 11.—**London, N.**—ALTERATIONS, ETC.—The St. Mary Islington Guardians invite tenders for certain alterations, etc., at Receiving Homes, Hornsey-rise, N. See advertisement in this issue for further particulars.

JANUARY 11.—**Radstock.**—COTTAGES.—Erection of twenty-eight cottages. Specifications from the Surveyor, Mr. G. H. Gibson, Radstock, near Bath. Deposit of 1*l.* 1s.

JANUARY 11. — **Southampton.** — WORKS.—For Construction of economiser flues and buildings, and supply and erection of a fuel economiser, at waterworks pumping station at Otterbourne; also for construction of a meter recorder house at Otterbourne-hill. Plans, specifications, and conditions seen, and quantities and forms of tender from the Waterworks Engineer, 33 and 35, French-street, Southampton, on deposit of 1*l.* 1s.

* JANUARY 12.—**Hinckley.**—EXTENSION OF POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for extension of post-office. See advertisement in this issue for further particulars.

JANUARY 12. — **Horton-in-Ribblesdale.** — SCHOOL.—For erection of Helwith Bridge new school. Plans seen, and specifications, with quantities, from the Education Architect, County Hall, Wakefield. Deposit of 1*l.*

JANUARY 12.—**Naas.**—WATER WORKS.—Erection of a new pump-house, the supplying and fixing of pumps, gas-engine, and other works. Plans and specification prepared by Mr. Francis Bergin, B.E., 36, Westmoreland-street, Dublin. Deposit of 1*l.* for quantities.

JANUARY 12.—**Owston.**—SCHOOL.—For erection of a new school at Owston, Carcroft. Plans seen, and specifications, with quantities, from the Education Architect, County Hall, Wakefield. Deposit of 1*l.*

JANUARY 12. — **Silkstone.**—SCHOOL.—For erection of a new school. Plans seen, and specifications, with quantities, from the Education Architect, County Hall, Wakefield. Deposit of 1*l.*

* JANUARY 12. — **Workington.**—POST-OFFICE.—The Commissioners of H.M. Works and Public Buildings invite tenders for new post-office. See advertisement in this issue for further particulars.

JANUARY 13.—**Cirencester.**—HOUSES.—Erection of twenty-four houses in Siddington-road. Drawings and specification seen, and quantities, on deposit of 2*l.* 2s., from Mr. V. A. Lawson, A.M.Inst.C.E., Council Buildings, Cirencester.

JANUARY 13. — **Honley.**—SEWER.—Construction of 9-in. sewer in Gynn-lane, near Honley Station. Plans seen, and quantities and form of tender from the Engineer, Mr. W. H. Radford, C.E., Albion-chambers, King-street, Nottingham, on deposit of 1*l.* 1s.

* JANUARY 15. — **Chatham.** — HOSPITAL EXTENSION.—The Secretary of State for War invites tenders for demolition of water tower and erection of new administrative, operation, and ward blocks and boiler-house at Military Hospital, Port Pitt. See advertisement in this issue for further particulars.

* JANUARY 15. — **Coventry.**—CLASSROOMS.—The Governors of Bablake School, Coventry, invite tenders for additional classrooms, gymnasium, etc. See advertisement in this issue for further particulars.

JANUARY 16. — **Gwaunfarren.**—VILLAS.—Erection of ten pairs of semi-detached villas, for the Marlborough Building Club. Plans and specifications with the architect, Mr. J. Mann, jun., 27, Lancaster-villas, Merthyr Tydfil.

* JANUARY 17. — **St. Albans.**—COTTAGES.—Tenders are invited for the erection of six cottages in Catherine-street, St. Albans. See advertisement in this issue for further particulars.

JANUARY 23. — **Ilford.** — SCHOOL.—Erection of elementary school. Plans and specifications seen, and quantities and forms of tender from the architect, Mr. C. J. Dawson, F.R.I.B.A., 11, Cranbrook-road, Ilford, on deposit of 5*l.* 5s.

JANUARY 31.—**Prescot.**—ADDITIONS.—For additions to the Council school. Plans seen, and quantities from the County Architect, Mr. H. Littler, 16, Ribblesdale-place, Preston. Deposit of 2*l.*

FEBRUARY 12. — **Whalley.** — ASYLUM.—For the completion of the erection of the asylum. Specification, general conditions, and quantities from Mr. Henry Littler, architect, 16, Ribblesdale-place, Preston, on deposit of 10*l.*

NO DATE.—**Barnsley.**—PREMISES.—Erection of new business premises for Messrs. Hunters, Ltd. Mr. W. Wrigley, A.R.I.B.A., architect, 2, King-street, Wakefield.

NO DATE.—**St. Albans.**—COTTAGES.—Erection of six new cottages, Catherine-street. Particulars from Mr. H. F. Mence, architect, 11, St. Peter's-street, St. Albans.

BUILDING—*continued.*

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

NO DATE.—**Waverton.**—VICARAGE.—Erection of new vicarage. Quantities and form of tender from Mr. J. H. Martindale, F.R.I.B.A., architect, Eaglesfield Abbey-rooms, Castle-street, Carlisle

ENGINEERING, IRON, AND STEEL.

✱ JANUARY 16, 1912. — **Truro.** — IRON GATES, RAILINGS, ETC.—The Cornwall C.C. invite tenders for wrought-iron gates and railings, etc., upon boundary walls at new County Offices. See advertisement in this issue for further particulars.

FURNITURE, PAINTING, MATERIALS, etc.

DECEMBER 29.—**Rhondda.**—TOOLS.—For supply of tools, etc., for the metalwork and woodwork classes at the new Pentre Handicraft Centre. Forms of tender from Mr. T. W. Berry, Director of Education, Council Offices, Pentre, Rhondda.

JANUARY 1, 1912. — **Leeds.** — PAINTING.—For painting, etc., to be done at the Central Home and Superintendent's house, Street-lane, Roundhay, and the Receiving Home, Leopold-street, Leeds. Specifications and forms of tender from Mr. James H. Ford, Clerk to the Guardians, Poor Law Offices, South-parade, Leeds.

JANUARY 1.—**North Uist.**—FENCE.—Erection of a six-wire corrimony fence. Particulars from Mr. H. H. Mackenzie, Factor, Balelone, Lochmaddy.

✱ JANUARY 11. — **Hampstead.** — WORKS, MATERIALS, OR SERVICES.—The Hampstead B.C. invite tenders for works, materials, or services for one or three years from April 1 next. See advertisement in this issue for further particulars.

JANUARY 13.—**Leeds.**—RETORTS, ETC.—For the supply of fireclay retorts, fire bricks, fire-brick lumps, and fireclay. Specification and form of tender from Mr. R. H. Townsley, General Manager, Gas Offices, East-parade, Leeds.

✱ JANUARY 16.—**Truro.**—SCREENS, PLATFORMS, AND FURNITURE.—The Cornwall C.C. invite tenders for supplying screens, platforms, and furniture for Council-chamber of new offices See advertisement in this issue for further particulars.

ROADS, SANITARY AND WATER WORKS.

DECEMBER 29.—**Northwood.**—SEWER.—For the construction of six lengths of sewers. Plans and specifications seen, and quantities and forms of tender from Mr. W. L. Carr, Surveyor, Council Offices, on deposit of 1*l.*

DECEMBER 30. — **Eastbourne.** — ROADS.—For private improvement works. Plan and specification seen, and form of tender from Mr. A. E. Prescott, Borough Surveyor, Town Hall, Eastbourne.

JANUARY 1, 1912.—**Edmonton.**—KERB.—Supply and delivery of kerb on edge. Forms of tender and particulars from Mr. Cuthbert Brown, A.M.Inst.C.E., Engineer and Surveyor to the Council, Town Hall, Edmonton.

JANUARY 1. — **Gildersome.** — GRANITE. — For supply of granite. Mr. W Wilby, Surveyor, Council Offices, Gildersome, Yorks.

JANUARY 5.—**Chesterfield.**—SEWAGE, ETC.—For laying a new sewer and surface-water drains, and construction of new approach road to the new burial ground. Plans and specifications seen, and quantities from the Borough Surveyor. Deposit of 1*l.* 1*s.*

JANUARY 6.—**Penarth.**—SEWER.—For extension of the Kymin outfall sewer Plans examined, and specification and quantities from Mr. Edgar J. Evans, A.M.Inst.C.E., Surveyor, District Council Offices, Penarth.

JANUARY 9.—**Aldershot.**—FLINTS.—For supply of Hungry Hill flints. Forms of tender from Mr. F. C. Uren, Surveyor, Municipal Buildings, Aldershot.

JANUARY 9.—**Meriden.**—GRANITE.—For supply of granite. Mr. A. W. Liggins, Clerk, 11, Priory-street, Coventry.

JANUARY 10.—**Didcot.**—ROAD.—For making a new road, for the Wallingford R.D.C. Plans and specifications from Mr. G. F. Slade, Clerk, Wallingford.

JANUARY 13.—**Bexley Heath.**—MATERIALS.—For materials. Specifications and forms of tender from Mr. W. T. Howse, Surveyor, Council Offices, Bexley Heath.

JANUARY 15.—**Hitchin.**—GRANITE.—For supply of broken granite. Mr. Wm O. Times, Clerk, Council Offices, Town Hall, Hitchin.

JANUARY 15. — **London.** — ROADS. — For the formation of two short connecting roads near the Recreation Ground, Freemasons-road, Custom House, E. Mr. William Jacques, A.R.I.B.A., 2, Fen-court, Fenchurch-street, E.C. Deposit of 1*l.*

JANUARY 20.—**Norfolk.**—GRANITE.—For supply of granite. Specification and tender forms from Mr. T. H. B. Heslop, M.Inst.C.E., County Surveyor, the Shirehouse, Norwich.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*LECTURER, BRICKWORK, CARPENTRY, JOINERY, ETC.	Council of the Harris Inst.	Not stated	Jan. 4

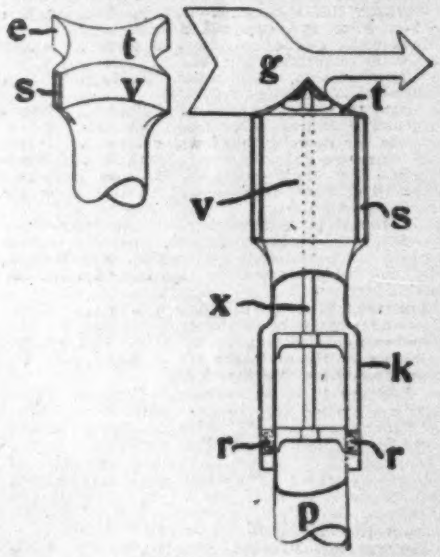
Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*FREEHOLD BUILDING LAND, FULHAM, S.W.—At the Mart	Edwin Fox, Bousfield, Burnetts, & Baddeley	Jan. 10
*DEALS, BATTENS, BOARDS, TIMBER, ETC.—Great Hall, Winchester House, E.C.	Churchill & Sim	Jan. 10

SELECTED PATENTS—*Continued from page 788.*

18,694 of 1910.—Henry Osmond Barnard: Ventilating-shaft tops.

This relates to a ventilating shaft top, wherein the top is formed of a number of curved plates having narrow unobstructed openings between them. A cap closes the upper end altogether or in part, and the coupling shaft is of less cross-section than the top; the top may be fixed or wind-directed.



18,694 of 1910.

The plates *v* are of parabolic cross-section and openings *s* are formed at the angular points. The cross-section of the shaft is gradually enlarged to that of the top, and the cap *t* may be a flat plate or be made up of curved plates completely closing the end. The lower part of the coupling shaft *k* may be enlarged, be fixed to, and stand off from, the shaft *p*, to which it is applied, so that rain may escape between them; or the top may have a windvane *g*, and be mounted on a central spindle *x* with rollers *r* between the shafts.

TO CORRESPONDENTS.

NOTE.—All communications with respect to literary and artistic matters should be addressed to "THE EDITOR" (and not to any person by name); those relating to advertisements and other exclusively business matters should be addressed to "THE PUBLISHER," and not to the Editor.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples sent to or left at this office, unless he has specially asked for them.

All drawings sent to or left at this office for consideration should bear the owner's name and address on either the face or back of the drawing. Delay and inconvenience may result from inattention to this.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

N.B.—Illustrations of the First Premiated Design in any important architectural competition will always be accepted for publication by the Editor, whether they have been formally asked for or not.

TRADE CATALOGUES.

We have received from the Wilson Rolling Shutter Company, of St. John's House, 124-127, Minories, London, E., a booklet descriptive of their improved rolling doors and shutters. These are of the interlocking slat type, and are designed as an improvement upon the various other types of shutters which have been hitherto in use, particularly with regard to the corrugated form of shutter made out of a continuous length of corrugated steel, and also to overcome the difficulties arising from the use of shutters composed of steel slats with a row of hinges riveted to the back, which are constantly liable to break away. The slats are so shaped at the edges as to form a continuous hinge running the whole width of the shutter. The shutters can be supplied for fixing to any class of opening and for attachment to buildings of brick, stone, cement, or iron or steel structures.

Messrs. Henry Hope & Sons, Ltd., of 55, Lionel-street, Birmingham, and 39, Victoria-street, Westminster, S.W., forward us a leaflet illustrating their new wedge mortise lock. The special wedge shape of the lock, it is claimed, saves time in fixing, preserves the strength of the door, less being cut away from the tenon of the lock rail than is necessary for a square-cased lock, and ensures better fixing, at least two screws in each case entering the solid wood. A great number of these locks have been used in the Royal Liver Buildings, Liverpool. The firm also call our attention to Hope's two-point casement handle, designed to hold a casement open one inch or one-quarter of an inch, a feat impossible with the common quadrant casement stay in gusty weather without the most irritating rattling.

Messrs. Lacy-Hulbert & Co., Ltd., pneumatic engineers, of 91, Victoria-street, London, S.W., send us leaflets of some of their latest designs for air compressors. A neat portable pattern, particularly adapted for blowing out dust from generators, motors, switch-gear, and electrical machinery of all kinds, is mounted on one base-plate with a substantial electric motor, and fitted with comparatively large wheels to facilitate ready transference from place to place, where the condition of the floor is unsuitable for wheels of small diameter, which can also be fitted without extra charge, if preferred. The base-plate itself forms an air receiver of considerable volume, which permits of the air being cooled and drained before passing through the base. The firm are also the manufacturers of the well-known "Boreas" rotary pumps. Driven by petrol engines or electric motors, mounted on one bed-plate, they make excellent sets for country houses and factories requiring water to be forced into tanks.

The Genest-Stoessel Insulating Company, of 47, Victoria-street, Westminster, forward us a pamphlet dealing with their Korfund foundation plates for deadening and absorbing the noise and vibration of machinery. Our readers need hardly be told that the question of efficient foundation for machinery is an exceedingly important one with regard to the building in which the plant is erected, whose stability is likely to be seriously endangered by excessive vibration. Korfund is made of cork strips, protected by iron framing from losing its elasticity by compression, and is made to order for the actual area of the

required foundations. The cork strips are specially selected, treated, and impregnated, and then securely bound together by an iron frame, stiffened by iron strutting. By these means it is claimed that Korfund insulating plates are free from the objections to which felt and unprotected cork are liable as insulators. It has been used with excellent results by many leading German architects and engineers.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

December 8.—By HANCOCK & SONS.

St. Kew, Cornwall.—Agricultural estate, 1,285 acres. *f.* £26,010

December 11.—By GEO. WIGLEY & SONS.

Simpson, Bucks.—Wood Farm, 123 a. 3 r. 23 p., *f.* 3,000

By W. H. & J. A. EADON.

Rotherham, Yorks.—25, Joseph-st., *f.*, gross rental 12*l.* 7*s* 200

77 to 83 (odd), Hope-st., *f.*, gross rental 49*l.* 8*s.* 520

94 to 108 (even), Hope-st., *f.*, gross rental 99*l.* 9*s.* 1,020

27 to 33, 39 to 45 (odd), Tenter-st., *f.*, gross rental 98*l.* 2*s* 1,160

Tenter-st., three plots, *f.* 610

13 and 15, Garden-la., *f.*, gross rental 25*l.* 2*s* 400

Tenter-st., *f.g.* rents 13*l.* 3*s.*, reversion in 56 yrs. 320

December 14.—By J. J. HILL & WEAVER.

Kegworth, Leics.—Malt House, Clarendon-villa, and 27 a. 3 r. 6 p., *f.* 1,800

By FAREBROTHER, ELLIS, & Co.

West Harptree, Somerset.—Impropriate tithe rent-charges 159*l.* 17*s.* 6*d.* 1,600

By MADDISON, MILES, & MADDISON.

Yarmouth, Norfolk.—23, Albion-rd., *f.*, w.r. 15*l.* 12*s.* 165

December 18.—By HAMPTON & SONS.

Leyton.—194, Vicarage rd., *f.*, y.r. 36*l.* 450

By HUNTER & HUNTER.

Marylebone.—14, Cunningham-pl., u.t. 12 yrs., g.r. 10*l.*, p. 140

By SNELL & Co.

St. John's Wood.—50, Clifton-hill, u.t. 25½ yrs., g.r. 10*l.*, o.r. 75*l.* 400

33, 35, 59, and 61, Springfield-rd., u.t. 25½ yrs., g.r. 34*l.* 8*s.*, y.r. 278*l.* 1,600

December 19.—By HALLET & BALLARD.

Horley, Surrey.—1 to 4, Hawthorn Cottages, and plot adjoining, *f.* 815

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; o.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beerhouse; p.h. for public-house; o. for offices; s. for shops; ct. for court.

PUBLISHER'S NOTICES.

Nat. Tel., 6112 Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME CI. (July to December, 1911) will be given as a supplement with January 12.

CLOTH CASES for Binding the Numbers will shortly be ready, price 2*s.* 6*d.* each; also

READING CASES (Cloth), with Strings, price 9*d.* each.

THE HUNDRED AND FIRST VOLUME of "The Builder" (bound, price Twelve Shillings and Sixpence, will be ready on JANUARY 21.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3*s.* 6*d.* each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, etc., etc.

Six lines or under ..... 6*s.* 0*d.*
Each additional line ..... 1*s.* 0*d.*

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4*s.* 0*d.*
Each additional line (about ten words) ..... 0*s.* 6*d.*

Terms for series of Trade advertisements, and for front page and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed—Labour only).

Four lines (about thirty words) or under ..... 2*s.* 6*d.*
Each additional line (about ten words) ..... 0*s.* 6*d.*

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps must not be sent; but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," 4, Catherine Street, W.C.

Advertisements for the current week's issue are received up to ONE p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after TWELVE NOON on that day. Those intended for the Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, etc., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

ADVERTISERS in "THE BUILDER" may have *Replies addressed to the Office*, 4, Catherine Street, Strand, W.C., *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

N.B.—The Reply Boxes are not intended for trade lists, circulars, and the like; should these be received, they cannot (if noticed) be forwarded.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { 'NINEPENCE EACH' By post (carefully packed), 1*s.*

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

Per 1000 Alongside, in River.	£ s. d.
Best Stocks	1 13 0
Picked Stocks for Facings	2 7 0

Per 1000, Delivered at Railway Depôt.

	£ s. d.		£ s. d.
Flettons	1 10 6	Best Blue Pressed Staffordshire	3 15 0
Best Fareham Red	3 12 0	Do. Bullnose	4 0 0
Best Red Pressed Ruabon Facing	5 0 0	Best Stourbridge Fire Bricks	4 0 0
GLAZED BRICKS—			
Best White, Ivory, and Salt Glzd. Str'tch'rs	11 7 6	Double Headers	13 17 6
Headers	10 17 6	One Side and two Ends	17 17 6
Quoins, Bullnose, and 4½ in. Flats	14 17 6	Two Sides and one End	18 17 6
D'ble Stretchers	16 17 6	Splays & Squints	16 7 6

Second Quality £1 10*s.* per 1000 less than best.

	s. d.	
Thames and Pit Sand	6 9	per yard, delivered.
Thames Ballast	5 6	"
Best Portland Cement	30 0	per ton, "
Best Ground Blue Lias Lime	19 0	"

NOTE—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 13*s.* 0*d.* per yard delivered.
Stourbridge Fireclay in sacks 27*s.* 0*d.* per ton at rly dpt.

STONE.

Per Ft. Cube.

	s. d.
BATH STONE — delivered on road waggons, Paddington Depôt	1 6½
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½
PORTLAND STONE (20 ft. average)—	
Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 3
White Basebed, delivered on road waggons Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 4½

Per Ft. Cube, delivered at Railway Depôt.

	s. d.		s. d.
Ancaster in blocks	1 10	Closeburn Red Freestone	2 0
Beer in blocks	1 6	Red Mansfield Freestone	2 4
Greenshill in blocks	1 10	Talacre & Gwespyr Stone	2 8
Darley Dale in blocks	2 4		
Red Corsehill in blocks	2 3		

YORK STONE—*Robin Hood Quality.*

Per Ft. Cube, Delivered at Railway Depôt.	s. d.
Scappled random blocks	2 10
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3
6 in. rubbed two sides ditto, ditto	2 6
3 in. sawn two sides slabs (random sizes)	0 11½
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7
1½ in. to 2 in. ditto, ditto	0 6

HARD YORK—

Per Ft. Cube, Delivered at Railway Depôt.	
Scappled random blocks	3 0
Per Ft. Super., Delivered at Railway Depôt.	
6 in. sawn two sides landing to sizes (under 40 ft. super.)	2 8
6 in. rubbed two sides ditto	3 0
3 in. sawn two sides slabs (random sizes)	1 2
2 in. self-faced random flags	0 5

SLATES.

Per 1000 of 1200 at Railway Depôt.

In. In.	£ s. d.	In. In.	£ s. d.
20×10 best blue Bango	13 2 6	20×10 best Eur'ka unfading green	15 17 6
20×12 ditto	13 17 6	20×12 ditto	18 7 6
20×10 1st quality ditto	13 0 0	18×10 ditto	13 5 0
20×12 ditto	13 15 0	16×8 ditto	10 5 0
16×8 ditto	7 5 0	20×10 permanent green	11 12 6
22×10 best blue Portmadoc	12 12 6	18×10 ditto	9 12 6
16×8 ditto	6 12 6	16×8 ditto	6 12 6

TILES.

At Railway Depôt.

	s. d.		s. d.
Best plain red roofing (per 1000)	42 0	Best "Hartshill" brand, plain sand-faced (per 1000)	50 0
Hip and Valley (per doz.)	3 7	Do. pressed (per 1000)	47 6
Best Broseley (per 1000)	50 0	Do. Ornamental (per 1000)	50 0
Do. Ornamental (per 1000)	52 6	Hip (per doz.)	4 0
Hip and Valley (per doz.)	4 0	Valley (per doz.)	3 6
Best Ruabon red, brown, or brindled (Edw'ds) (per 1000)	57 6	Staffords. (Hanley) Reds or Brindled (per 1000)	42 6
Do. Ornamental (per 1000)	60 0	Hand-made sand-faced (per 1000)	45 0
Hip (per doz.)	4 0	Hip (per doz.)	4 0
Valley (per doz.)	3 0	Valley (per doz.)	3 6

WOOD.

BUILDING WOOD.	At per standard. £ s. d.		£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	14 0 0	...	15 10 0
Deals: best 3 by 9	13 10 0	...	14 10 0

WOOD (*Continued*).

BUILDING WOOD (*Continued*).	At per standard. £ s. d.		£ s. d.
Battens: best 2½ in. by 7 in. and 8in., and 3 in. by 7 in. and 8 in.	11 10 0	...	12 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0		less than 7 in. and 8 in.
Deals: seconds	1 0 0		less thn best.
Battens: seconds	0 10 0	"	"
2 in. by in. and 2 in. by 6 in.	9 10 0	...	10 10 0
2 in. by 4½ in. and 2 in. by 5 in.	9 0 0	...	10 0 0
Foreign Sawn Boards—			
1 in. and 1¼ in. by 7 in.	0 10 0		more than battens.
¾ in.	1 0 0		"
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 5 0 0	...	5 10 0
Seconds	4 10 0	...	5 0 0
Small timber (8 in. to 10 in.)	3 17 6	...	4 0 0
Small timber (6 in. to 8 in.)	3 5 0	...	3 10 0
Swedish balks	2 12 6	...	3 0 0
Pitch-pine timber (30 ft. average)	5 5 0	...	6 0 0

JOINERS' WOOD.	At per standard. £ s. d.		£ s. d.
White Sea: first yellow deals, 3 in. by 11 in.	24 10 0	...	25 10 0
3 in. by 9 in.	22 10 0	...	23 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	...	18 0 0
Second yellow deals, 3in. by 11in.	19 0 0	...	20 0 0
" " 3 in. by 9 in.	18 0 0	...	19 10 0
Battens, 2½ in. and 3in. by 7 in.	14 0 0	...	15 0 0
Third yellow deals, 3 in. by 11 in. and 9 in.	14 0 0	...	15 0 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	...	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 10 0	...	22 10 0
Do. 3 in. by 9 in.	18 10 0	...	19 10 0
Battens	14 0 0	...	15 0 0
Second yellow deals, 3 in. by 11 in	16 10 0	...	17 10 0
Do. 3 in. by 9 in.	15 0 0	...	16 0 0
Battens	11 10 0	...	12 10 0
Third yellow deals, 3in. by 11 in.	13 10 0	...	14 10 0
Do. 3 in. by 9 in.	13 0 0	...	14 0 0
Battens	10 10 0	...	11 0 0
White Sea and Petersburg—			
First white deals, 3 in. by 11 in.	15 0 0	...	16 0 0
" " 3 in. by 9 in.	14 0 0	...	14 10 0
Battens	11 10 0	...	12 10 0
Second white deals, 3in. by 11in.	14 0 0	...	15 0 0
" " 3 in. by 9 in.	13 0 0	...	14 0 0
Battens	10 10 0	...	11 0 0
Pitch-pine: deals	19 0 0	...	21 0 0
Under 2 in. thick extra	0 10 0	...	1 0 0
Yellow Pine—First, regular sizes	44 0 0		upwards.
Oddments	32 0 0		"
Seconds, regular sizes	33 0 0		"
Oddments	28 0 0		"
Kurai Pine—Planks per ft. cube.	0 3 6	...	0 5 0
Danzig and Stettin Oak Logs—			
Large, per ft. cube	0 3 0	...	0 3 9
Small " "	0 2 6	...	0 2 6
Wainscot Oak Logs, per ft. cube	0 5 6	...	0 6 0
Dry Wainscot Oak, per ft. sup. as inch	0 0 9	...	0 0 11
¼ in. do. do.	0 0 8	...	—
Dry Mahogany—Houndras, Tabasco, per ft. super. as inch	0 0 10	...	0 1 1
Selected, Figury, per ft. super. as inch	0 1 6	...	0 2 6
Dry Walnut, American, per ft. super. as inch	0 0 10	...	0 1 0
Teak, per load	18 0 0	...	22 0 0
American Whitewood planks, per ft. cube	0 4 0	..	0 5 0

Prepared Flooring, etc.—	Per square.		
1 in. by 7 in. yellow, planed and shot	0 13 6	...	0 17 0
1 in. by 7 in. yellow, planed and matched	0 14 0	...	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	...	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	...	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	...	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	...	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	...	0 13 6
1 in. by 7 in. " "	0 14 0	...	0 18 6
¾ in. by 7 in. white " "	0 10 0	...	0 11 0
1 in. by 7 in. " "	0 12 9	...	0 15 0

6 in. at 6*d.* to 9*d.* per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.		£ s. d.
Rolled Steel Joists, ordinary sections	7 10 0	...	8 0 0
Compound Girders, ordinary sections	9 10 0	...	10 0 0
Steel Compound Stanchions	11 0 0	...	12 0 0
Angles, Tees, and Channels, ordinary sections	9 10 0	...	10 0 0
Flitch Plates	9 10 0	...	9 10 0
Cast Iron Columns & Stanchions, including ordinary patterns	7 10 0	...	8 10 0

METALS.

	Per ton, in London. £ s. d.		£ s. d.
IRON—			
Common Bars	8 10 0	...	9 0 0
Staffordshire Crown Bars, good merchant quality	8 15 0	...	9 5 0
Staffordshire "Marked Bars"	10 10 0	...	—
Mild Steel Bars	8 15 0	...	9 5 0
Hoop Iron, basis price	9 5 0	...	9 10 0
" " Galvanised	17 0 0	...	—
("And upwards, according to size and gauge.)			
Sheet Iron Black—			
Ordinary sizes to 20 g.	9 15 0	...	—
" " 24 g.	10 15 0	...	—
" " 26 g.	12 5 0	...	—
Sheet Iron, Galvanised, flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	15 0 0	...	—
Ordinary sizes to 22 g. and 24 g.	15 10 0	...	—
" " 26 g.	16 10 0	...	—
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	18 0 0	...	—
" " 22 g. and 24 g.	18 10 0	...	—
" " 26 g.	20 0 0	...	—

METALS (Continued).

IRON (Continued)—	Per ton, in London. £ s. d.		£ s. d.
Galvanised Corrugated Sheets—	£ s. d.		
Ordinary sizes, 6ft. to 8ft. 20 g.	14 10 0 ...		—
" " 22 g. and 24 g.	14 15 0 ...		—
" " 26 g.	16 5 0 ...		—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	13 0 0 ...		—
Best Soft Steel Sheets, 2 g. & 24 g.	13 0 0 ...		—
" " " 26 g.	15 0 0 ...		—
Cut Nails, 3 in. to 6 in.	10 10 0 ...	11 0 0	

(Under 3 in., usual trade extras.)

LEAD, &c.

	£ s. d.		
LEAD—Sheet, English, 4lb. and up	19 7 6 ...		—
Pipe in coils	19 17 6 ...		—
Soil pipe	22 17 6 ...		—
Compo pipe	22 17 6 ...		—
ZINC—Sheet—	In casks of 10 cwt.		
Vieille Montagne	33 10 0 ...		—
Silesian	33 5 0 ...		—
Zinc, in bundles, 1s. per cwt. extra.			
COPPER—			
Strong Sheet per lb.	0 1 0 ...		—
Thin " "	0 1 1 ...		—
Copper nails "	0 0 10 ...		—
Copper wire "	0 0 10 ...		—
BRASS—			
Strong Sheet "	0 0 11 ...		—
Thin "	0 1 0 ...		—
TIN—English Ingots "	0 2 0 ...		—
SOLDER—Plumbers' "	0 0 8½ ...		—
Tinmen's "	0 0 11 ...		—
Blowpipe "	0 1 2 ..		—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

15 oz. thirds	2½d.	26 oz. fourths	3½d.
" fourths	1½d.	32 oz. thirds	3d.
21 oz. thirds	3d.	" fourths	4½d.
" fourths	2½d.	Fluted Sheet, 15 oz.	3½d.
26 oz. thirds	4d.	" 21 oz.	4½d.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.*

Per Ft., Delivered.

⅛ Hartley's	2d.	Figured Rolled, Oxford Rolled, Oceanic, Arctic, Muffled, and Rolled Cathedral, white	3½d.
¼ "	2½d.		
⅜ "	2½d.	Ditto, tinted	5d.

* Not less than three crates.

OILS, &c.		£ s. d.
Raw Linseed Oil in pipes	per gallon	0 3 0
" " in barrels	"	0 3 1
" " in drums	"	0 3 3
Boiled " in barrels	"	0 3 3
" " in drums	"	0 3 6
Turpentine in barrels	"	0 2 11
" in drums	"	0 3 1
Genuine Ground English White Lead,	per ton	25 0 0
Red Lead, Dry	"	22 10 0
Best Linseed Oil Putty	per cwt.	0 10 0
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 6
Fine Elastic Carriage	0 12 0
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 10 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flating Varnish	0 18 0
White Pale Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 0
Berlin Black	0 16 0
Knotting	0 10 9
French and Brush Polish	0 10 6

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us not later than 10 a.m. on Thursday. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100l. unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BEXHILL.—For sea-wall extension. Mr. Geo. Bull, Assoc.M.Inst.C.E., Borough Engineer and Surveyor, Borough Engineer and Surveyor's office, Town Hall, Bexhill:—

W. Hill & Co.	£8,059 13 2
G. Munday & Sons	7,009 5 0
G. Shellabear & Son	6,842 0 0
J. W. Pearce	5,791 3 4
Pethick Bros., Ltd.	5,312 0 0
W. Muirhead & Co., Ltd.	5,069 3 9
W. Gradwell & Co., Ltd.	4,745 1 3
Exors. of J. Arundel	4,588 11 11
S. Carey, Haddocks Hill-road, Bexhill*	4,184 16 4

COBHOLM ISLAND.—For erection of a new boys' school for 440 boys, for the Great Yarmouth Education Committee. Mr. J. W. Cockrill, M.Inst.C.E., A.R.I.B.A., Borough Surveyor. Quantities by Borough Surveyor:—

Wright	£5,290	Carter & Wright	£3,916
Beech	4,227	Moore & Sons	3,898
Grimble	4,149	Eastoe, Denesside, Great Yarmouth*	3,890
Balls	3,984		
Ditcham & Lamb	3,950		

IPSWICH.—For the erection of new offices, Malting, with grain stores, for Messrs. Thomas Mortimer, Ltd. Mr. F. W. Skipper, architect and surveyor, 55, London-street, Norwich:—

Catchpole & Sons, Ltd.	£9,380
Greenwood & Sons, Ltd.	9,279
I. Youngs & Sons	9,276
F. Bennett*	8,930

LLANELLY.—For six houses, for Mr. H. W. Lloyd, Llanelly. Mr. Joseph Billett, architect, 33, Prospect-place, Llanelly, Carmarthenshire:—

T. Williams, Dimpath*	£1,627

PORTSMOUTH.—For the erection of additional baths, wells, etc., for the Portsmouth Ice and Cold Storage Company, Ltd. Mr. A. E. Cogswell, architect, Portsmouth:—

Tight & Son	£1,363	J. Crookerell	£1,34
Springings	1,324	F. Privett	1,2
J. Croad	1,286	S. Salter	1,2

[All of Portsmouth.]

RIPLEY (near Derby).—For erection of a cottage hospital, for the Ripley Cottage Hospital Committee. Mr. R. Argile, architect, 30, Oxford-street, Ripley, near Derby. Quantities by the architect:—

Evans Bros.	£1,590 0 0
G. Brentnall	1,504 0 0
F. H. & J. W. Moore	1,440 5 6
Harris & Hunt, Marchay, Derby‡	1,310 0 0

‡ Accepted subject to deductions as per schedule.

STEVENAGE.—For erection of a fire-station, for the Stevenage Urban District Council. Mr. J. R. Vining, architect, 89, Chancery-lane, W.C.:—

Shrouder & Matthews	£713	W. J. Spratt, Stevenage*	£635
W. Austin & Sons	670	Palmer & Ray	600

WALTHAMSTOW.—For alterations, new partitions, etc., at the Forest-road Infants' School, Walthamstow, N.E., for the Education Committee. Mr. H. Prosser, M.S.A., architect:—

A. G. Barton	£113 0	G. M. Page	£161 1
J. & J. Dean	110 0	J. Sands*	90 0

[All of Walthamstow.]

Ham Hill Stone.
Doulting Stone.
Portland Stone.

The Ham Hill and Doulting Stone Co., Limited
(Incorporating the Ham Hill Stone Co. and G. Treat & Son, The Doulting Stone Co.).
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London Agent:—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Co. (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to Forth Bridge Co. T.N. 2644 Central.

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